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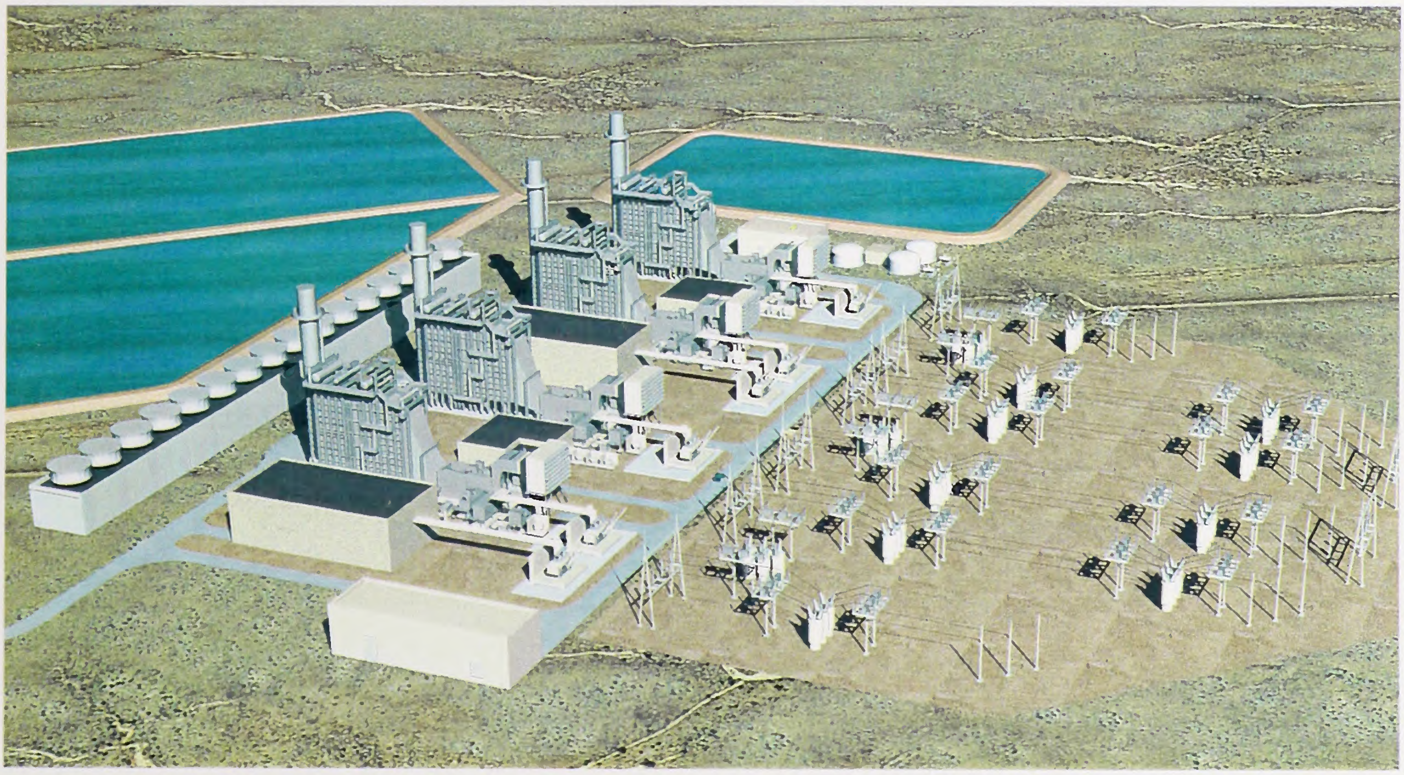

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Reno, Nevada 89520-0006
http://www.nv.blm.gov

MAY 20 2002

In Reply Refer To:
2800/2200 (NV-040)
N-74943/N-74105

Dear Reader:

Enclosed for your review and comment is the Draft Toquop Land Disposal Amendment to the Caliente Management Framework Plan (MFP) and Draft Environmental Impact Statement (EIS) for the Toquop Energy Project. This document evaluates the environmental effects that would result from constructing an 1,100-megawatt (MW) natural gas-fired water-cooled electric power generating plant and associated features on public lands in Lincoln County and Clark County, southern Nevada, that are presently managed by the Ely and Las Vegas Field Offices of the U.S. Bureau of Land Management (BLM). The power plant site would be near the Toquop Wash, approximately 50 miles south-southeast of Caliente, Nevada, and 12 miles northwest of Mesquite, or alternatively, approximately 12 miles north-northwest of the Toquop Wash site in the Tule Desert. This document also evaluates the effects of amending the Caliente MFP, which would identify specific sections of land as available for disposal. This action would be needed to exchange approximately 640 acres of private land (the Pah Rah parcel) in Washoe County, northwestern Nevada, for a similarly valued parcel of public land at one of the power plant sites. The Pah Rah parcel would come under BLM administration if the Pah Rah/Toquop land exchange is approved.

Public comments concerning the adequacy and accuracy of the Draft MFP Amendment/EIS will be accepted until August 29, 2002, and must be submitted in writing to:

Bureau of Land Management
Ely Field Office
Gene A. Kolkman, Field Manager
HC 33, Box 33500
Ely, Nevada 89301-9408

Public meetings to accept verbal and written comments have also been scheduled for the following dates, times, and locations:

Date	Time	Location
July 8, 2002	7:00 to 9:00 p.m.	Caliente City Hall 100 Depot Avenue Caliente, Nevada
July 9, 2002	7:00 to 9:00 p.m.	Las Vegas BLM Field Office 4701 Torrey Pines Drive Las Vegas, Nevada
July 10, 2002	7:00 to 9:00 p.m.	Mesquite City Hall Training Rooms A and B 10 East Mesquite Boulevard Mesquite, Nevada
July 11, 2002	7:00 to 9:00 p.m.	Airport Plaza Hotel 1981 Terminal Way Reno, Nevada

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Both written and oral comments received during the public comment period will be fully considered and evaluated for preparation of the Final MFP Amendment/EIS. If you would like any additional information, please contact Dan Netcher, Team Lead at (775) 289-1872.

Sincerely,

Thomas V. Leshendok

for Robert V. Abbey
State Director, Nevada

Enclosure

Draft Toquop Land Disposal Amendment to the Caliente Management Framework Plan and Draft Environmental Impact Statement for the Toquop Energy Project

(X) Draft **( ) Final**

Lead Agency: United States Department of the Interior
Bureau of Land Management
Counties Directly Affected: Lincoln, Clark, and Washoe Counties, Nevada
Environmental Impact Statement Contact: Correspondence on this Draft Environmental Impact Statement (Draft EIS) should be directed to:

Dan Netcher
Team Lead
Ely Field Office

Gene A. Kolkman, Field Manager
Bureau of Land Management Ely District
HC 33 Box 33500
Ely, Nevada 89301-9408

Date Draft EIS filed with U.S. Environmental Protection Agency: May 31, 2002

Date by which comments on this draft plan amendment and Draft EIS must be received to be considered in the Final EIS: August 29, 2002

Abstract

This Draft Toquop Land Disposal Amendment to the Caliente Management Framework Plan (MFP) and Draft Environmental Impact Statement (EIS) for the Toquop Energy Project evaluates the environmental effects that would result from constructing the proposed Toquop Energy electric power generating plant. This 1,100-megawatt (MW) natural gas-fired and water-cooled electric power plant and associated features would be located on public lands in Lincoln County and Clark County, southern Nevada, that are presently managed by the Ely and Las Vegas Field Offices of the U.S. Bureau of Land Management (BLM). The power plant site for the Proposed Action is approximately 50 miles south-southeast of Caliente, Nevada, and 12 miles northwest of Mesquite, Nevada. An alternative power plant site is located in the Tule Desert approximately 12 miles north-northwest of the Toquop Wash plant site.

This document also evaluates the effects of amending the Caliente MFP, which would identify specific sections of land as available for disposal. This action would be needed to exchange approximately 640 acres of private land (the Pah Rah parcel) for a similarly valued parcel of public land at one of the power plant sites. The Pah Rah parcel is located in the Pah Rah Range in Washoe County in northwestern Nevada, and would come under BLM administration if the Pah Rah/Toquop land exchange is approved.

Federal actions addressed in the accompanying document are the BLM's issuance of rights-of-way needed to construct and operate the Toquop Energy Project, amendment of the Caliente MFP to identify specific public lands as available for disposal, and facilitation of a land exchange as it relates to the proposed project. This Draft EIS satisfies the National Environmental Policy Act, which mandates that federal agencies analyze the environmental consequences of major undertakings.

Official responsible for the plan amendment and the environmental impact statement:

for Robert V. Abbey
State Director, Nevada

Date MAY 20 2002

ID:88063931

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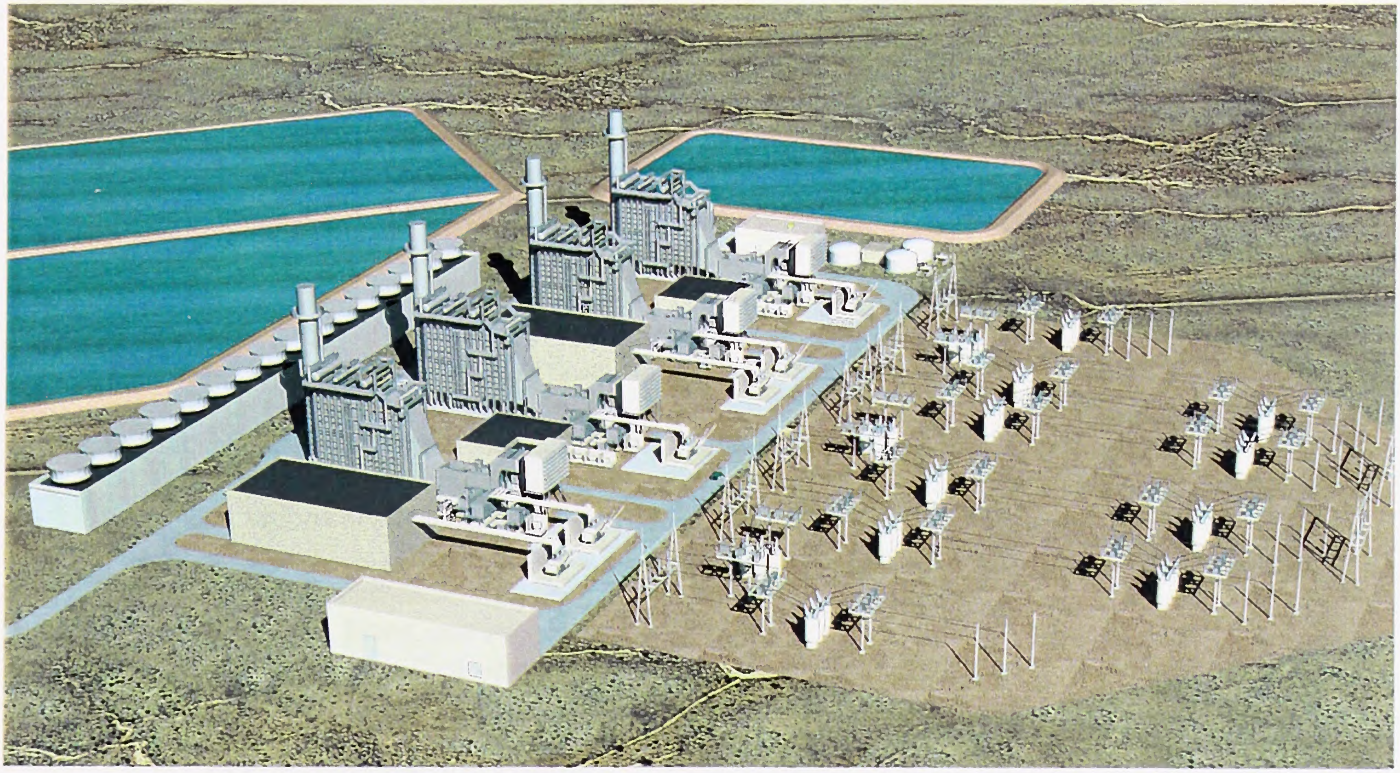
Draft Toquop Land Disposal Amendment to the Caliente Management Framework Plan and Draft Environmental Impact Statement for the Toquop Energy Project



United States Department of Interior
Bureau of Land Management
DES 01-17

Nevada State Office, Nevada
May 2002

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Executive Summary

ES.0 Executive Summary

The following sections summarize the Draft Toquop Land Disposal Amendment to the Caliente Management Framework Plan (MFP) and the Draft Environmental Impact Statement (DEIS) for the proposed Toquop Energy Project. This summary provides a general overview of the project and its purpose and need; briefly describes the Proposed Action and other alternatives; summarizes major impacts for key resources associated with the Proposed Action, each action alternative, and the No Action Alternative; and lists key consultation and coordination activities.

ES.1 Introduction

ES.1.1 General Overview

The Proposed Action and alternatives for the Toquop Energy Project were developed in response to a proposal by Toquop Energy, Inc., (Toquop Energy) to construct and operate a 1,100-megawatt (MW) natural gas-fired electric power generating plant in Lincoln County in southern Nevada. The plant and associated features would be on public lands that are presently managed by the Ely Field Office of the U.S. Bureau of Land Management (BLM). The power plant site for the Proposed Action is near the Toquop Wash, approximately 50 miles south-southeast of Caliente, Nevada, and 12 miles northwest of Mesquite, Nevada. An alternative power plant site is approximately 12 miles north-northwest of the Toquop Wash plant site. The power plant would require connections to natural gas, electric transmission, water, and site access facilities, which would require rights-of-way (ROWs) from the BLM. The BLM would issue ROWs for a total of 42 years to cover the construction and expected operational life of the project.

This document evaluates the potential environmental effects that would result from constructing and operating the Toquop Energy electric power generating plant. It also evaluates the effects of amending the Caliente MFP, which would identify specific sections of land as available for disposal. This action would be needed to exchange approximately 640 acres of private land (the Pah Rah parcel) for a similarly valued parcel of public land at the Toquop Wash plant site or at the alternative plant site in Lincoln County. The Pah Rah parcel is presently owned by the Nevada Land and Resource Company LLC (NLRC) and is located in the Pah Rah Range in Washoe County in northwestern Nevada. The Pah Rah parcel would come under BLM administration if the Pah Rah/Toquop land exchange is approved. Map ES-1 shows the project area for the Toquop Land Disposal Amendment to the Caliente MFP and the Toquop Energy Project.

ES.1.2 Purpose and Need

The proposed plant would generate electrical power at competitive costs for use by consumers to ease the near- and long-term shortages of power in the western United States. The proposed project would contribute to meeting the demand for power in the Las Vegas area and would also contribute to meeting the capacity and annual energy requirements for the Arizona-New Mexico-southern Nevada power area.

Needed and desired economic benefits would result from increasing the Lincoln County tax base through sales, use, and property taxes on the acquired and privately owned parcel of exchanged land and power plant improvements, employment opportunities during project construction and operation, and increased revenue from project-related purchases of goods and services.

Responding to a request for a land exchange, the project would provide the BLM with a mechanism for acquiring a desirable parcel of private land in the Pah Rah Range in northwestern Nevada. This Pah Rah parcel contains valuable sage grouse habitat (a species of concern) which could be brought under public management. The proposed land exchange would further facilitate public land management by the BLM by creating contiguous tracts of land.

ES.2 Description of Proposed Action and Alternatives

ES.2.1 Proposed Action and Action Alternatives

The Proposed Action and two other action alternatives were developed for the Toquop Land Disposal Amendment to the Caliente MFP and Toquop Energy Project. They include the following:

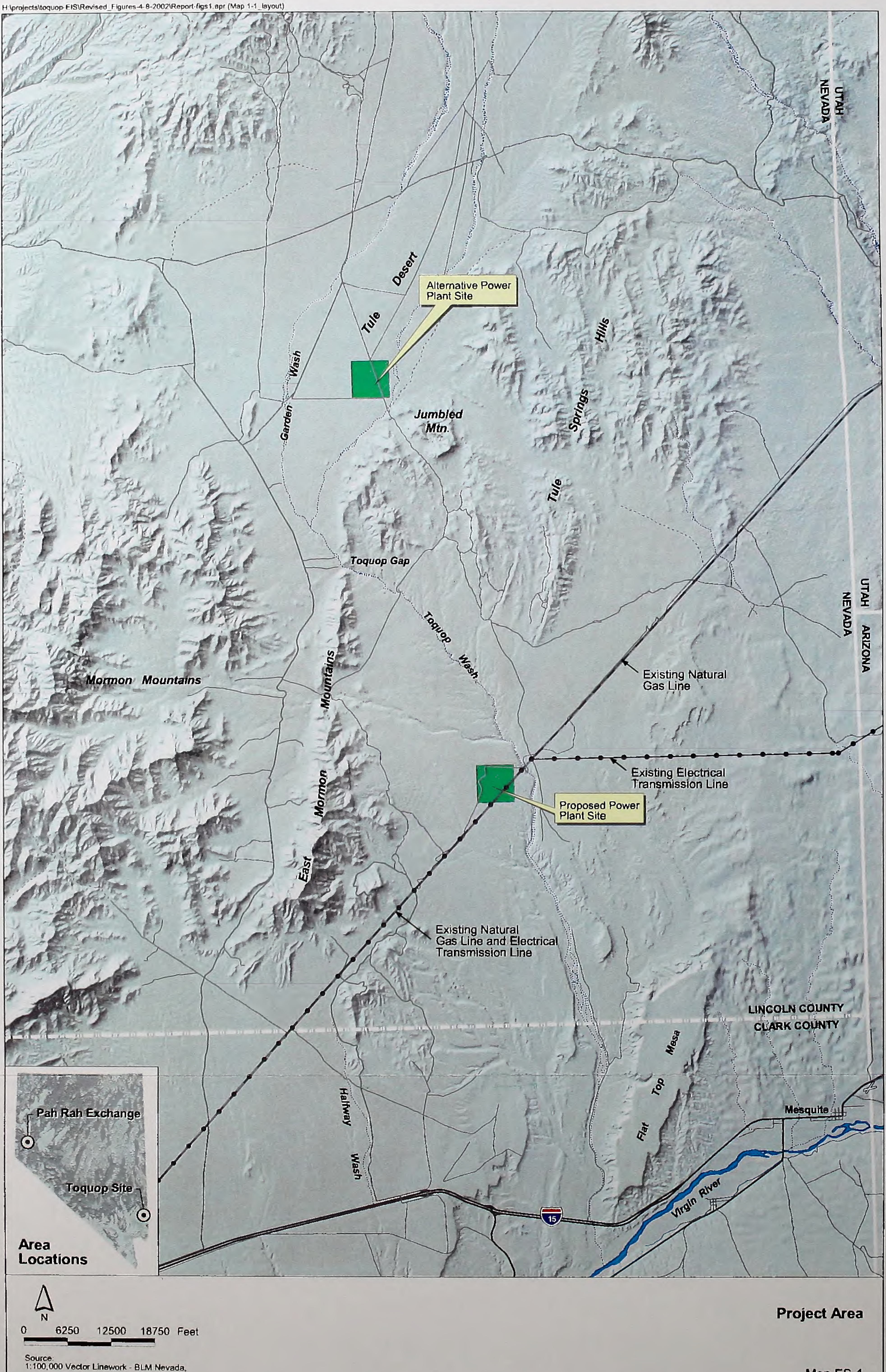
- Proposed Action (Caliente MFP Amendment, Toquop Land Exchange, and/or Southern Power Plant Site ROW, Western Utility Alignment ROW, wellfield ROW, and access road ROW)
- Alternative 1 (Caliente MFP Amendment, Toquop Land Exchange, and/or Southern Power Plant Site ROW, Eastern Utility Alignment ROW, wellfield ROW, and access road ROW)
- Alternative 2 (Caliente MFP Amendment, Land Exchange and/or Northern Power Plant Site ROW, Eastern Utility Alignment ROW, wellfield ROW, and access road ROW)

Table ES-1 summarizes the specific elements of the Proposed Action, Alternative 1, and Alternative 2. These elements include BLM actions, project facilities and features, and Best Management Practices (BMPs) and Standard Operating Procedures (SOPs) that would be implemented as an integral part of the Proposed Action and action alternatives. An option to the Proposed Action and both alternatives that is evaluated in this document would be for the BLM to issue ROWs for all project facilities, including the power plant site.

ES.2.2 No Action Alternative

Under the No Action Alternative, the Caliente MFP would not be amended, the Pah Rah/Toquop land exchange would not occur, project-related ROWs would not be created, and the power plant and related facilities would not be built or operated as described for the Proposed Action, Alternative 1, or Alternative 2.

H:\projects\toquop-EIS\Revised_Figures-4-8-2002\Report-figs1.apr (Map 1-1_layout)



Project Area

Source:
1:100,000 Vector Linework - BLM Nevada,

Map ES-1

CH2MHILL

TABLE ES-1
Summary Description of Proposed Action and Action Alternatives

		Alternative	
Project Element	**Proposed Action**	**Alternative 1**	**Alternative 2**
	BLM Actions		
Caliente MFP Amendment	Amend the Caliente MFP to identify the site as suitable for disposal through sale or exchange		
Pah Rah/Toquop Land Exchange	Complete a land exchange between the BLM and NLRC		
	Exchange publicly owned Section 36, T11S, R69E in Lincoln County for privately owned Section 9, T20N, R23E in Washoe County		Exchange publicly owned Section 4, T10S, R69E in Lincoln County for privately owned Section 9, T20N, R23E in Washoe County
ROWs	Issue ROWs by the BLM for constructing and operating the power plant and all related facilities		
	Power Plant Facilities		
Power plant construction	Construct and operate a 1,100-MW combined cycle, natural gas-fired electric generating plant		
Power plant location	Section 36, T11S, R69E in Lincoln County (southern power plant site)		Section 4, T10S, R69E, in Lincoln County adjacent to the Tule Desert wellfield (northern power plant site)
Electric distribution and transmission lines	Construct and operate buried electric distribution power lines from the power plant to the well pumps and overhead transmission lines from the plant to the Navajo-McCullough Electric Transmission Line		
	1,300-foot, 500-kV transmission line. Distribution line to the wellfield along the 12.5-mile-long western water pipeline ROW	1,300-foot, 500-kV transmission line. Distribution line to the wellfield along the 12.6-mile-long eastern water pipeline ROW	12.0-mile-long, 500-kV transmission line from the northern plant site along the eastern utility corridor ROW. Short distribution line to the wellfield
Gas pipeline	2,400-foot, 20-inch pipeline from the Kern River Gas Pipeline to the southern power plant site		12.0-mile-long, 20-inch pipeline from the Kern River Gas Pipeline along the eastern utility corridor ROW to the northern power plant site
	Road Access and Transportation		
Access road to power plant	Pave to a width of 24 feet and straightening sections of approximately 14.4 miles of an existing dirt and gravel road to produce an access road extending from I-15 to the southern plant site		Paving to a width of 24 feet and straightening sections of approximately 26.6 miles of an existing dirt and gravel road from I-15 to the northern plant site

TABLE ES-1
Summary Description of Proposed Action and Action Alternatives

Project Element	Proposed Action	Alternative 1	Alternative 2
Access ROW to wellfield	Provide a 12.5-mile-long access ROW between the southern power plant site and the ground water wellfield along an existing dirt and gravel road	Provide a 12.6-mile-long access ROW between the southern power plant site and the ground water wellfield along an existing dirt and gravel road	Northern power plant site is near the wellfield
Ground Water Wellfield			
Wellfield	Drill up to 15 wells over the life of the project in the Tule Desert Basin sufficient to produce an annual average flow of 3,800 gallons per minute (gpm) (7,100 gpm peak daily) of water for the power plant, which will use up to 7,000 acre-feet per year Construct and operate a manifold collection system to interconnect the water output from the wellfield to a pressure-regulating water tank		
Water tank	Construct and operate a pressure-regulating water tank located near the wellfield before the water pipeline to the power plant		
Water Pipeline			
Water pipeline	Construct and operate a 24-inch-diameter buried water pipeline extending from the wellfield to the power plant		
	12.5-mile-long western pipeline alignment through Toquop Gap.	12.6-mile-long eastern pipeline alignment	Power plant is near the wellfield
Best Management Practices and Standard Operating Procedures			
ROWs	Comply with the terms and conditions of all ROWs issued by the BLM.		
Desert tortoise	Protect desert tortoise and their habitat by following management prescriptions during project construction, operation, and maintenance activities that are consistent with the Desert Tortoise Recovery Plan, relevant Habitat Conservation Plans, and other management documents.		
BMPs and SOPs	Follow best management practices (BMPs) and standard operating procedures (SOPs) typically associated with the construction, operation, and maintenance of power plants, wellfields, pipelines, other utility corridors, and related facilities in this region of the western United States to avoid or minimize the potential for adverse environmental effects resulting from project-related activities		
Cultural resources	Comply with stipulations of the *Cultural Resources Programmatic Agreement* (Appendix C) to ensure that historic and prehistoric properties will be treated to avoid or mitigate project-related effects to the extent practical and to satisfy BLM responsibilities.		

ES.2.3 Alternatives Considered During Scoping but Eliminated from Further Consideration

Alternative fuels, project locations, and cooling systems were considered during project scoping but eliminated from detailed analyses, because they failed to meet project purpose and need, were operationally infeasible, were economically infeasible, and/or were environmentally unacceptable. Alternative fuels were eliminated because they would not be as efficient as using natural gas to generate electrical power at competitive costs. In addition, the effects of using some alternative fuels would make them less environmentally attractive than using natural gas. Alternative project locations were eliminated because they would present unacceptable environmental impacts, increased costs for fuel delivery and transmission line access, and a lack of economic benefits to communities within and near Lincoln County. In contrast, the selected project location would provide benefits to Toquop Energy and consumers through the cost-effective generation and sale of electricity to help meet power shortages, to the BLM through their acquisition of a desirable and privately-owned parcel of land (the Pah Rah parcel), and to Lincoln County through increased economic benefits from project development. Several alternative cooling systems were eliminated from further consideration because they would not be economically feasible and would not provide sufficient economic benefits to Lincoln County.

ES.2.4 Preferred Alternative

BLM's Preferred Alternative is the Proposed Action.

ES.3 Affected Environment and Environmental Consequences

ES.3.1 Proposed Action and Action Alternatives

Table ES-2, at the end of this chapter, summarizes major impacts anticipated under the Proposed Action and each action alternative by resource area as well as BMPs, SOPs, and mitigation measures that would be implemented. These measures are designed to avoid or prevent the occurrence of impacts and, where possible, to minimize the magnitude, extent, and duration of those impacts when their occurrence can not be prevented. The four broad categories of measures listed in Table ES-1 encompass the set of BMPs, SOPs, and mitigation measures referenced in Table ES-2. Briefly, they include complying with terms and conditions of ROWs issued by BLM; implementing SOPs and BMPs during project construction, operation, and maintenance that cover a broad range of resource areas and activities; following management prescriptions for protecting desert tortoises and their habitat; and complying with stipulations of the *Cultural Resources Programmatic Agreement*. Table ES-2 also notes any cumulative impacts anticipated from the combined effects of the proposed project and other reasonably foreseeable projects.

Unavoidable adverse impacts on resources are those residual impacts remaining after implementation of mitigation measures. These impacts would primarily be associated with lands that would be disturbed and/or included in construction ROWs. Lands disturbed during construction would total 449 acres under the Proposed Action, 451 acres under Alternative 1, and 581 acres under Alternative 2. Following reclamation, net new long-term impacts would total 182 acres under the Proposed Action and Alternative 1 and 237 acres under Alternative 2. Affected resources would include soils and biological soil crusts; several threatened, sensitive, and/or protected species such as desert tortoise; plant species and vegetative cover; some wildlife species and their habitat; and the Mormon Mesa Area of Critical Environmental Concern (ACEC). Use of ground water from the Tule desert wellfield also would represent an unavoidable adverse impact. Another possible unavoidable adverse impact would be the accidental disturbance of cultural resources if inadvertently encountered during construction. Implementation of all BMPs, SOPs, and mitigation measures listed and/or referenced in Table ES-2 would serve to reduce the extent, magnitude, and duration of these unavoidable adverse impacts in the same way that other potential impacts would be prevented from occurring.

Construction of the proposed project would result in the irreversible and irretrievable commitments of some resources. Irreversible impacts would include labor, capital, some construction materials, fuels, and ground water. Irretrievable impacts on environmental resources would generally not extend past the life of the project. Affected resources would include biological resources, air quality and noise, visual and recreation resources, land use for livestock, the Mormon Mesa ACEC, possibly cultural resources, and socioeconomics.

ES.3.2 No Action Alternative

No project-related impacts would occur under the No Action Alternative, and the affected environment (existing conditions) in the Toquop area and on the Pah Rah parcel would be the same as at present. However, the No Action alternative would not meet any of the purposes and needs identified for the proposed project.

ES.4 Consultation and Coordination

Public scoping for the Draft Toquop Land Disposal Amendment to the Caliente MFP/ Toquop Energy Project DEIS was comprised of three separate scoping efforts:

- Scoping for the Pah Rah/Toquop Land Exchange—including public meetings conducted by the BLM during July 2001 in Mesquite and Reno
- Public meetings and scoping for the Toquop Energy Project—including public meetings conducted by the BLM during July 2001 in Caliente and Mesquite, and a scoping meeting in Las Vegas in August 2001
- Scoping for the combined Toquop Energy Project and Pah Rah/Toquop Land Exchange EIS, requiring an amendment to the Caliente MFP—conducted by BLM during November and December 2001

Most individuals who commented at the first set of scoping meetings opposed the land exchange. Those that did not state a position had questions about particular potential impacts, including wildlife habitat, cultural and historical resources, economic values, water development, visual and recreation resources, validity of the land exchange, and the NEPA process.

The Notice of Intent (NOI) to prepare the EIS on the Toquop Energy Project (the second set of public meetings) was published in the *Federal Register* on July 22,

2001. Three individuals favored the project, indicating the site would not have serious environmental consequences. However, many individuals were concerned about potential impacts that should be addressed in the DEIS, including water development, use and ground water impacts; wildlife habitat and soils; air quality and noise; economics and land exchange values; and comprehensive plans, cumulative effects, and the NEPA process. Many attending the public meetings were concerned that if an out-of-state company were selected to construct the Toquop Energy facility, the chosen firm would bring in out-of-state workers to build the plant.

In reviewing comments received during the first two scoping processes, the BLM determined that combining the two NEPA processes had merit. It was also determined that the Pah Rah/Toquop Land Exchange required an amendment to the Caliente Management Framework Plan. Consequently, the decision was made to combine these actions into a single EIS and to reopen the scoping process for the expanded project.

The NOI to prepare an amendment to the Caliente MFP and an EIS for the Toquop Land Disposal Amendment to the Caliente MFP/Toquop Energy Project was published in the *Federal Register* on November 7, 2001. The public comment period closed on December 7, 2001. Because the previous two scoping processes included public meetings, the BLM determined that further public scoping meetings were duplicative and unnecessary for the expanded EIS. Written comments received from the public suggested an air-cooled plant as an alternative; ground water withdrawal effects; air quality, cultural resources, and natural resources impacts; land exchange values and statutes; and NEPA compliance.

Numerous federal, state, and local governmental agencies and Indian Tribes were consulted during the preparation of this DEIS. Native American consultation occurred initially in relation to the land exchange proposal, now an alternative component of the Toquop Energy Project. Consultation with American Indian tribes also was initiated specifically in regard to the Toquop Energy Project itself. Some Indian Tribes have indicated to BLM that they have no concern about the Proposed Action and its alternatives. For other Indian Tribes, BLM has requested, but not received, sufficient information to establish whether project-related issues exist for Native Americans, including any issues related to the location and use of the Salt Song Trail. Concerns have been expressed for the preservation of all archaeological sites.

This document has been sent to, and comments requested from, the general public and entities including federal, state, and local governments; Tribal governments; other organizations; and Members of Congress. The document is available at numerous libraries.

A series of four public meetings will be held to receive comments on the DEIS. Dates and locations of these meetings are as follows:

Date	Location
July 8, 2002	Caliente, Nevada
July 9, 2002	Las Vegas, Nevada
July 10, 2002	Mesquite, Nevada
July 11, 2002	Reno, Nevada

TABLE ES-2
Summary of Impacts and BMPs, SOPs, and Mitigation by Resource for the Proposed Action and Action Alternatives

Resource[1]	Proposed Action	Alternative 1	Alternative 2	BMPs, SOPs, and Mitigation[2]
3.2.1 and 4.2.1—Soils				
Toquop Area	449 acres initially disturbed and/or in construction ROWs. 267 acres would be reclaimed and 182 acres used for project features.	451 acres initially disturbed and/or in construction ROWs. 269 acres would be reclaimed and 182 acres used for project features.	581 acres initially disturbed and/or in construction ROWs. 344 acres would be reclaimed and 237 acres used for project features.	Project is designed to minimize surface disturbance. Implement BMPs and SOPs for erosion control, dust suppression, site stabilization and reclamation, and place signs to discourage OHV use Implement stormwater management plan to prevent runoff, erosion, and sedimentation (see Surface Water Hydrology below)
	Disturbance and some loss of biological soil crusts at plant site and along pipeline alignment		Disturbance and some loss of biological soil crusts along pipeline alignment and possibly at plant site	
	Temporary increase in erosion and wind-blown dust, potential localized increase in runoff and erosion, and possibly increased off-highway vehicle (OHV) use along improved access road			
Pah Rah Parcel	None	None	None	None
Cumulative Effects	No cumulative soil erosion impacts in the Toquop area or Pah Rah parcel			None
3.2.2 and 4.2.2—Geology				
Toquop Area	None	None	None	None
Pah Rah Parcel	None	None	None	None
Cumulative Effects	None	None	None	None

TABLE ES-2
Summary of Impacts and BMPs, SOPs, and Mitigation by Resource for the Proposed Action and Action Alternatives

Resource[1]	Proposed Action	Alternative 1	Alternative 2	BMPs, SOPs, and Mitigation[2]
3.3 and 4.3—Surface Water Hydrology				
Toquop Area	Potentially degraded surface water quality from increased concentrations of suspended solids (sediment from disturbed soils) and dissolved constituents (such as petroleum hydrocarbons and metals from parking areas) Increased runoff from impervious surfaces at plant site and potential for flash flooding in washes Increased flows in washes adjacent to the filled wash at power plant on the southern site			Implement stormwater management systems and plans per National Pollutant Discharge Elimination System (NPDES) stormwater permits Construct stormwater retention basin at plant site sized for 100-year event Implement BMPs and SOPs for erosion, sedimentation, and stabilization control, sediment detention basins, stormwater conveyance, and monitoring plan effectiveness Divert and redirect flows from filled wash at southern plant site to minimize erosion of adjacent washes Schedule construction activities in washes when probability for flash flooding is minimal
Pah Rah Parcel	None	None	None	None
Cumulative Effects	None	None	None	None
3.4 and 4.4—Ground Water Resources				
Toquop Area	Ground water levels in the fractured-rock aquifer in the Tule Desert would only be significantly lowered as a result of project pumping in the immediate vicinity (within a distance of approximately 1,000 feet) of the production wells. Accordingly, there would be no substantial lowering of the water levels across the Tule Desert on the whole, nor would there be a substantial depletion of the ground water resource in the Tule Desert. This conclusion applies to both the fractured-rock aquifer as well as to ground water in the basin-fill deposits within the Tule Desert. The effects described above would be restricted to the Tule Desert hydrographic area. Outside of the Tule Desert, ground water levels will not be lowered in either the fractured-rock aquifer or the basin-fill sediments.			Ground water levels in both the fractured rocks and the basin fill within the Tule Desert downgradient of the wellfield will be monitored and assessed. Ground water quality in the Tule Desert will be monitored and assessed. Pumped ground water will be monitored periodically to ensure its quality is suitable for power plant operation. The potential for contaminant releases that could affect resources will be minimized by adherence to regulatory requirements on hazardous substances (see Hazardous and Solid Wastes below).

TABLE ES-2
Summary of Impacts and BMPs, SOPs, and Mitigation by Resource for the Proposed Action and Action Alternatives

Resource[1]	Proposed Action	Alternative 1	Alternative 2	BMPs, SOPs, and Mitigation[2]
	No adverse effects on ground water resources would occur as a result of the Proposed Action, Alternative 1, or Alternative 2. Primary conclusions are as follows: • No lowering of ground water levels in existing wells would occur • No regional depletion of ground water resources would occur • No decrease in the discharge from local springs would occur • No degradation of ground water quality would occur • No decrease in the flow of the Virgin River would occur as a result of the project In addition, the potential for land subsidence and a corresponding loss of storage in either the fractured-rock aquifer or the basin-fill deposits is negligible. The temporary handling and storage of chemical substances and waste products would have a slight potential to affect ground water quality if there were an accidental release of these substances to the environment.			
Pah Rah Parcel	None	None	None	None
Cumulative Effects	None	None	None	None

TABLE ES-2
Summary of Impacts and BMPs, SOPs, and Mitigation by Resource for the Proposed Action and Action Alternatives

Resource[1]	Proposed Action	Alternative 1	Alternative 2	BMPs, SOPs, and Mitigation[2]
3.5.1 and 4.5.1—Threatened, Endangered, and Sensitive Species				
Toquop Area	Construction disturbance of 449 acres of desert tortoise habitat (habitat for 8 tortoises). Net new long-term disturbance of 182 acres (habitat for 3 tortoises).	Construction disturbance of 451 acres of desert tortoise habitat (habitat for 8 tortoises). Net new long-term disturbance of 182 acres (habitat for 3 tortoises).	Construction disturbance of 581 acres of desert tortoise habitat (habitat for 10 tortoises). Net new long-term disturbance of 237 acres (habitat for 4 tortoises).	BMPs, SOPs, and mitigation measures to protect desert tortoise and their habitat include the Terms and Conditions to implement Reasonable and Prudent Measures Numbers 5, 6, and 7 in the U.S. Fish and Wildlife Service's *Biological Opinion for the Caliente Management Framework Plan Amendment*. Measures also include SOPs issued by BLM to aid in the recovery of the desert tortoise. In addition, permanent tortoise-proof fencing will be required for the access road from I-15 to the southern plant site. Categories of BMPs, SOPs, and mitigation include the following: • Tortoise protection measures • Education by qualified biologist • Flagging of disturbed areas • Tortoise location and removal by qualified biologist • Speed limits • Signage • Trash and litter control • Spill handling procedures • Construction methods • Habitat remuneration See Appendix A for detail on desert tortoise BMPs, SOPs, and mitigation measures.
	Construction disturbance of 236 acres of desert tortoise critical habitat in the Mormon Mesa Area of Critical Environmental Concern (ACEC). Following reclamation, the net new long-term disturbance would be 65 acres. For Alternative 2 only, additional disturbance of approximately 44 acres of desert tortoise critical habitat outside the Mormon Mesa ACEC.			
	Direct and indirect impacts on tortoises resulting in their take and/or harassment from ground-disturbing construction activities; increased human activities during project construction, operation, and maintenance; and increased public access.			
	Potential for impacting other special status species or habitats including birds during breeding season, burrowing owls, bat roosts (if encountered), Gila monsters, and chuckwallas.			Implement BMPs and SOPs for other special status species and/or their habitats, including bird nesting, breeding, and fledging; burrowing owl burrows and nesting cavities; trapping and relocating Gila monsters and chuckwallas; and avoiding bat roosts (if encountered).
Pah Rah Parcel	Management of important wildlife habitat, particularly for sage grouse, would be enhanced under BLM administration			None

TABLE ES-2
Summary of Impacts and BMPs, SOPs, and Mitigation by Resource for the Proposed Action and Action Alternatives

Resource^1	Proposed Action	Alternative 1	Alternative 2	BMPs, SOPs, and Mitigation^2
Cumulative Effects	Impacts of non-federal actions, projects, and activities on the desert tortoise continue to occur throughout the range of the species. Off-highway vehicle use, shooting, and collecting of individuals continue to impact tortoise populations. The combined area of impact of all projects evaluated represents less than 27,750 acres or about 0.006 percent of the approximately 5 million acres of desert tortoise habitat in southern Nevada.			None
3.5.2 and 4.5.2—Vegetation and Noxious Weeds				
Toquop Area	Construction disturbance and/or loss of 449 acres of habitat and vegetative cover. Net new long-term disturbance following reclamation of 182 acres.	Construction disturbance and/or loss of 451 acres of habitat and vegetative cover. Net new long-term disturbance following reclamation of 182 acres.	Construction disturbance and/or loss of 581 acres of habitat and/or vegetative cover. Net new long-term disturbance following reclamation of 237 acres.	Implement BMPs and SOPs for site reclamation, restoration, and revegetation, as appropriate Identify and remove protected plant species from construction corridors and replant later Adhere to BLM's standard weed control stipulations Place signs to discourage off-road vehicle (OHV) use
	Protected species of cactus and yuccas along utility corridors may be impacted			
	Increased potential for the introduction and spread of noxious weeds and possibly increased OHV use along the improved access road			
Pah Rah Parcel	Native vegetation condition would be enhanced under BLM management through regulated livestock grazing, fire suppression, and monitoring			None
Cumulative Effects	Minor cumulative impacts would occur with the addition of the small amount of acres disturbed by the Toquop Energy Project to the larger area (27,000 acres) disturbed by interrelated projects.			None

TABLE ES-2
Summary of Impacts and BMPs, SOPs, and Mitigation by Resource for the Proposed Action and Action Alternatives

Resource[1]	Proposed Action	Alternative 1	Alternative 2	BMPs, SOPs, and Mitigation[2]
3.5.3 and 4.5.3—Wild Horses and Burros				
Toquop Area	Portions of the wellfield and utility corridors are managed for wild horses			Fencing well heads, pumping locations, and the northern plant site will prevent access by wild horses
			The northern power plant site is managed for wild horses	
Pah Rah Parcel	None	None	None	None
Cumulative Effects	None	None	None	None
3.5.4 and 4.5.4—Wildlife and Fisheries Resources				
Toquop Area	Construction disturbance and/or loss of 449 acres of wildlife habitat. Net new long-term disturbance of 182 acres.	Construction disturbance and/or loss of 451 acres of wildlife habitat. Net new long-term disturbance of 182 acres.	Construction disturbance and/or loss of 581 acres of wildlife habitat. Net new long-term disturbance of 237 acres.	Implement BMPs for biological resources, landscape preservation and impact avoidance, and reclamation, restoration, and revegetation Place signs warning of desert bighorn sheep crossing along the access road
	Direct and indirect effects on wildlife species resulting from ground-disturbing construction activities; increased human activities during project construction, operation, and maintenance; and increased public access.			
	Potential effects include disturbance and localized displacement of mobile species and some loss of less mobile species, such as reptiles and small mammals			
	Desert bighorn sheep may be impacted by increased traffic on the improved access road in a portion of the East Mormon foothills			
	No direct or indirect effects on aquatic habitat and fisheries of the Virgin River			

TABLE ES-2
Summary of Impacts and BMPs, SOPs, and Mitigation by Resource for the Proposed Action and Action Alternatives

Resource[1]	Proposed Action	Alternative 1	Alternative 2	BMPs, SOPs, and Mitigation[2]
Pah Rah Parcel	Management of important wildlife habitat (for example, sage grouse) would be enhanced under BLM administration			None
Cumulative Effects	An ongoing potential exists for added incremental impacts on wildlife and wildlife habitat from other projects in the region, as well as regional benefits to wildlife from Habitat Conservation Plans			None
3.5.5 and 4.5.5—Wetlands/Riparian Zones, Floodplains, and Waters of the United States				
Toquop Area	Approximately 46 ephemeral washes would be crossed by project features	Approximately 91 ephemeral washes would be crossed by project features	Approximately 137 ephemeral washes would be crossed by project features	Restore and revegetate affected ephemeral washes according to conditions of a Clean Water Act Section 404 Permit Also, see BMPs, SOPs, and mitigation above for *Surface Water Hydrology*
	No impacts on wetlands/riparian zones or floodplains except as noted above in *Surface Water Hydrology*			
Pah Rah Parcel	None	None	None	None
Cumulative Effects	None	None	None	None
3.6.1 and 4.6.1—Air Quality				
Toquop Area	Effects would primarily be short-term and localized, resulting from construction activities that create fugitive dust and vehicle and equipment engine emissions.			Implement air pollution prevention BMPs and SOPs to comply with federal requirements of the Prevention of Significant Deterioration (PSD) permitting program of the Clean Air Act
	Some degradation of air quality during construction and operation but no modeled violations of air quality standards			Use best available control technologies (BACTs) for regulated emissions vented through stacks and vents and for sources of fugitive dust emissions during project construction, operation, and maintenance
Pah Rah Parcel	None	None	None	None
Cumulative Effects	The combined effects of the proposed project, other sources with emission permits or submitted permit applications, all reasonably foreseeable actions, plus natural background concentrations would be well below allowable standards for all pollutants			None

TABLE ES-2
Summary of Impacts and BMPs, SOPs, and Mitigation by Resource for the Proposed Action and Action Alternatives

Resource[1]	Proposed Action	Alternative 1	Alternative 2	BMPs, SOPs, and Mitigation[2]
3.6.2 and 4.6.2—Noise				
Toquop Area	Noise would exceed ambient levels during construction and operation at a relatively minor level			Implement BMPs and SOPs for noise pollution prevention
Pah Rah Parcel	None	None	None	None
Cumulative Effects	None	None	None	None
3.7 and 4.7—Visual Resources				
Toquop Area	Presence of vehicles, equipment, personnel, activities, and project features in the viewshed during construction and operation			Implement BMPs and SOPs to minimize fugitive dust emissions and restore disturbed areas
	No adverse effect on visual experience from the Mormon Mountains Wilderness Study Area (WSA) approximately 5.5 miles distant			Use colors, non-glare materials, lighting, structure orientation, and landscaping to blend project features with the environment and comply with the BLM's Visual Resource Management (VRM) Class IV for the Toquop area
Pah Rah Parcel	None	None	None	None
Cumulative Effects	No adverse cumulative effects			None
3.8 and 4.8—Recreation Resources				
Toquop Area	Discontinuation of limited, existing recreation opportunities on the fenced portions of the power plant sites would be offset by improved recreationists access to the area because of the upgraded access road			None
Pah Rah Parcel	Transferring ownership from private to public would make the Pah Rah parcel available for public recreation			None
Cumulative Effects	None	None	None	None

TABLE ES-2
Summary of Impacts and BMPs, SOPs, and Mitigation by Resource for the Proposed Action and Action Alternatives

Resource[1]	Proposed Action	Alternative 1	Alternative 2	BMPs, SOPs, and Mitigation[2]
3.9 and 4.9—Land Use, Prime or Unique Farmland, Rangelands				
Toquop Area	Removal of up to 17 acres in the wellfield from current livestock use may affect portions of the White Rock, Garden Springs, Summit Spring, and Snow Spring allotments			Implement BMPs and SOPs associated with fences and wire gates, repair any damages to existing range improvements, and include Big Galleta grass in the seed mix to revegetate disturbed corridors
	Temporary disturbance of rangeland managed for livestock use along the utility corridors in the Garden Springs and Gourd Spring allotments			Obtain a variance or special use permit to develop a non-agricultural facility in an agricultural zoned area, and coordinate with others relative to grazing issues
			Removal of 640 acres of rangeland within the Garden Springs Allotment being managed for livestock use may reduce permitted grazing use by 46 AUMs	At the northern power plant site repair any loss of range improvement developments
Pah Rah Parcel	Grazing may be facilitated under BLM administration through the integrated management of this parcel and adjacent public lands			None
Cumulative Effects	None	None	None	None
3.10 and 4.10—Wilderness Study Areas, Areas of Critical Environmental Concern, and Wild and Scenic Rivers				
Toquop Area	Construction disturbance of 236 acres of habitat within the Mormon Mesa ACEC along the improved access road from Interstate 15 (I-15) to the southern power plant site. Following reclamation, a net new long-term disturbance of 65 acres.			Implement BMPs and SOPs for road construction and site reclamation, and consult with BLM and FWS to minimize the potential for environmental impacts Limit OHV access and the potential for noxious weed/invasive plant introductions, and educate employees on related issues
Pah Rah Parcel	None	None	None	None
Cumulative Effects	None	None	None	None

TABLE ES-2
Summary of Impacts and BMPs, SOPs, and Mitigation by Resource for the Proposed Action and Action Alternatives

Resource[1]	Proposed Action	Alternative 1	Alternative 2	BMPs, SOPs, and Mitigation[2]
3.11 and 4.11—Wastes, Hazardous and Solid				
Toquop Area	None	None	None	Develop and implement a Spill Prevention Control and Countermeasures Plan (SPCCP) Proper onsite storage, containment, and handling of hazardous and solid wastes Offsite disposal at a licensed facility of hazardous and solid wastes that have accumulated onsite
Pah Rah Parcel	None	None	None	None
Cumulative Effects	None	None	None	None
3.12 and 4.12—Cultural and Historical Resources and Native American Religious Concerns				
Toquop Area	Ten sites and two isolated artifacts would be affected directly. None of these sites or isolates are eligible for listing on the National Register of Historic Places (NRHP)	Twelve sites and nine isolated artifacts would be affected directly. One of these sites is eligible for listing on the NRHP.	Six sites and ten isolated artifacts would be affected directly. One of these sites is eligible for listing on the NRHP.	Implement stipulations of the Cultural Resources Programmatic Agreement (see Appendix C for detail), including resource avoidance or recovery; consultation with the State Historic Preservation Office and interested parties, including Indian Tribes, to develop site-specific mitigation measures; and processes for the inadvertent discovery of human remains and unanticipated finds during construction Without additional information from Indian Tribes, no avoidance or other mitigation measures can be developed for any issues or concerns they may have
	Indirect impacts could potentially result from greater human activity in the area and possibly increased OHV use Some Indian Tribes have indicated to BLM that they have no concern about the Proposed Action and its alternatives. For other Indian Tribes, BLM has requested, but not received, sufficient information to establish whether project-related issues exist for Native Americans, including any issues related to the location and use of the Salt Song Trail. Concerns have been expressed for the preservation of all archaeological sites.			

TABLE ES-2
Summary of Impacts and BMPs, SOPs, and Mitigation by Resource for the Proposed Action and Action Alternatives

Resource[1]	Proposed Action	Alternative 1	Alternative 2	BMPs, SOPs, and Mitigation[2]
Pah Rah Parcel	Transfer of this parcel to public ownership may help ensure long-term protection/stewardship of cultural resources on the parcel			None
Cumulative Effects	No known cumulative effects			None
3.13 and 4.13—Indian Trust Assets				
Toquop Area	None	None	None	None
Pah Rah Parcel	None	None	None	None
Cumulative Effects	None	None	None	None
3.14 and 4.14—Environmental Justice				
Toquop Area	None	None	None	None
Pah Rah Parcel	None	None	None	None
Cumulative Effects	None	None	None	None
3.15 and 4.15—Paleontological Resources				
Toquop Area	None	None	None	None
Pah Rah Parcel	None	None	None	None
Cumulative Effects	None	None	None	None

TABLE ES-2
Summary of Impacts and BMPs, SOPs, and Mitigation by Resource for the Proposed Action and Action Alternatives

Resource[1]	Proposed Action	Alternative 1	Alternative 2	BMPs, SOPs, and Mitigation[2]
3.16 and 4.16—Socioeconomics				
Toquop Area	Project would generate short-term (500 to 950 jobs) and long-term (25 jobs) employment, income, and tax base opportunities			Provide onsite fire and emergency medical services
	Substantial economic benefits to Lincoln County from increased tax receipts would total approximately $15 million during the 26-month construction period and an additional $390,000 per year during each year of the 40 years of power plant operation under the Proposed Action and Alternative 1, and slightly higher under Alternative 2			Develop a police, fire, and medical aid agreement through consultation with Lincoln County and for the City of Mesquite to provide personnel and services to the project site
	Lincoln County's estimated share of the leased water rights would be up to $9 million over the life of the project			
	Increased project-related sales tax disbursed back to Clark County would be small relative to the County's current total tax receipts			
	Increased property tax income to Lincoln County from the land exchange would be beneficial to the county's current total property tax income			
	No adverse impacts on economic variables or community infrastructure in the Lincoln/Clark County area although project would place additional demand on police protection, fire protection, and emergency medical services.			
Pah Rah Parcel	Decreased property tax income to Washoe County from the land exchange would not substantially affect county tax receipts			None
Cumulative Effects	Types of potential cumulative beneficial effects (jobs, income, tax receipts) and adverse effects (police, fire, and medical needs) would be the same as for the proposed project, with no adverse impacts because of project-related BMPs, SOPs, and mitigation			Same as for proposed project

TABLE ES-2
Summary of Impacts and BMPs, SOPs, and Mitigation by Resource for the Proposed Action and Action Alternatives

Resource[1]	Proposed Action	Alternative 1	Alternative 2	BMPs, SOPs, and Mitigation[2]
3.17 and 4.17—Transportation				
Toquop Area	Temporary 26-month increase in average daily traffic on I-15 near the East Mesa Interchange and at the interchange during project construction No adverse long-term impacts			Implement BMPs and SOPs for transportation such as scheduling work to minimize generation of additional traffic, scheduling vehicles to create smooth traffic flow patterns, yielding right-of-way at constricted areas, and regulating project vehicles' speeds
Pah Rah Parcel	None	None	None	None
Cumulative Effects	Short-term cumulative impacts on traffic flow at the East Mesa Interchange may occur if construction of the Toquop Energy Project overlaps with construction of the Kern River Pipeline Expansion			None

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[1] Refers to detailed resource discussions in DEIS sections of Chapter 3 (Affected Environment) and Chapter 4 (Environmental Consequences).

[2] Detailed BMPs, SOPs, and mitigation measures are contained in DEIS Appendix A for desert tortoise and their habitat; Appendix B for BMPs and SOPs associated with project construction, operation, and maintenance covering a broad range of resource areas and activities; and Appendix C for cultural resources. These measures also include complying with the terms and conditions of all ROWs issued by the BLM.

Chapter 1
Introduction

Chapter 1.0 Introduction

1.1 General Overview

This document represents the Draft Toquop Land Disposal Amendment to the Caliente Management Framework Plan (MFP) and the Draft Environmental Impact Statement (DEIS) for the proposed Toquop Energy Project in southern Nevada. The Proposed Action and alternatives evaluated in this document were developed in response to a proposal by Toquop Energy, Inc. (Toquop Energy) to construct and operate a 1,100-megawatt (MW) natural gas-fired electric power generating plant. Toquop Energy is a wholly-owned subsidiary of Cogentrix Energy, Inc. (Cogentrix). The plant and associated features would be located on lands presently managed by the Ely Field Office of the U.S. Bureau of Land Management (BLM). This document evaluates the potential environmental effects that would result from constructing and operating the electric power generating plant. It also evaluates the effects of amending the Caliente MFP in order to exchange a private parcel of land owned by the Nevada Land and Resource Company, LLC (NLRC) for a federally managed parcel of public land where the plant would be located. Toquop Energy would acquire the power plant site from NLRC. The power plant would require connections to natural gas, electric transmission, water, and site access facilities, which would require Rights-of-Way (ROWs) from the BLM.

This document was prepared in compliance with the Council on Environmental Quality (CEQ) regulations for implementing the National Environmental Policy Act (NEPA) (40 CFR § 1500-1508); the *NEPA Handbook,* H-1790-1; the Ely Field Office *Environmental Analysis Guidebook*; Sections 201, 202, and 206 of the Federal Land Policy and Management Act (FLPMA) of 1976 (43 CFR § 1600); and the *Land Use Planning Handbook* (BLM Handbook H-1601-1).

1.2 Purpose and Need

The proposed plant would generate electrical power at competitive costs for use by consumers to ease the near- and long-term shortages of power in the western United States. The proposed project would contribute to meeting the demand for power in the Las Vegas area and would also contribute to meeting the capacity and annual energy requirements for the Arizona-New Mexico-southern Nevada power area.

Needed and desired economic benefits would result from increasing the Lincoln County tax base through sales, use, and property taxes on the acquired and privately owned parcel of exchanged land and power plant improvements, employment opportunities during project construction and operation, and increased revenue from project-related purchases of goods and services.

Responding to a request for a land exchange, the project would provide the BLM with a mechanism for acquiring a desirable parcel of private land in the Pah Rah Range in northwestern Nevada. This Pah Rah parcel contains valuable sage grouse habitat (a species of concern) which could be brought under public management. The proposed land exchange would further facilitate public land management by the BLM by creating contiguous tracts of land.

1.3 Project Location

The Toquop Energy Project area is located in Lincoln County in southern Nevada on public lands presently managed by the Ely Field Office of the BLM (see Map 1-1). The power plant site for the Proposed Action is near the Toquop Wash, approximately 50 miles south-southeast of Caliente and 12 miles northwest of Mesquite. An alternative power plant site is approximately 12 miles north-northwest of the Toquop Wash plant site. Approximately 640 acres of private land (the Pah Rah parcel) presently owned by the NLRC in the Pah Rah Range in Washoe County in northwestern Nevada (see Map 1-2) would be exchanged for a similarly valued parcel of public land at the Toquop Wash plant site or at the alternative plant site in Lincoln County.

1.4 Background

The Western Systems Coordinating Council (WSCC) estimates a demand for approximately 11,300 MW of new power generation to be constructed in its region of the western United States over the next 10 years to maintain reliable operation of the transmission system. The 1,100-MW Toquop Energy Project would produce electricity for sale on a long-term contractual basis to an energy wholesaler for distribution to the WSCC power grid to meet a portion of this demand. After the electricity is sold to the wholesaler, the energy would be distributed based on the demand for power existing at that time. The proposed project has been designed to help meet the increasing electric demand of a growing area and efficiently provide the lowest possible cost to the consumer, while complying with applicable federal, state, and local environmental rules and regulations.

NLRC owns over 1.2 million acres of land in northern Nevada, lying in a checkerboard pattern interspersed with other privately owned and federally managed public lands. Because much of the NLRC land has many resources desirable to the BLM and is addressed for acquisition in BLM land use plans, and because certain disposable BLM-managed lands are desirable for economic development by NLRC, certain land exchanges in Nevada would benefit both parties and the general public. The proposed project would include an exchange of approximately 640 acres of land owned by NLRC in the Pah Rah Range in Washoe County for a similarly valued federal parcel near the Toquop Wash in Lincoln County or at an alternative site 12 miles to the north-northwest. The alternative site is adjacent to and contiguous with a proposed project wellfield in the Tule Desert.

1.5 Policies, Plans, and Programs

1.5.1 Plan Conformance

Exchange of the Pah Rah Range parcel is consistent with existing land use plans in Washoe County and the BLM *Carson City Field Office Consolidated Resource Management Plans* (CRMP) and would provide an opportunity to consolidate public lands for more logical and beneficial land management. However, the Toquop parcels of public land in Lincoln County have not been identified for disposal in the current Caliente MFP. Therefore, amending the MFP would be required in order for the land exchange to occur. The project would also conform with the Las Vegas RMP.

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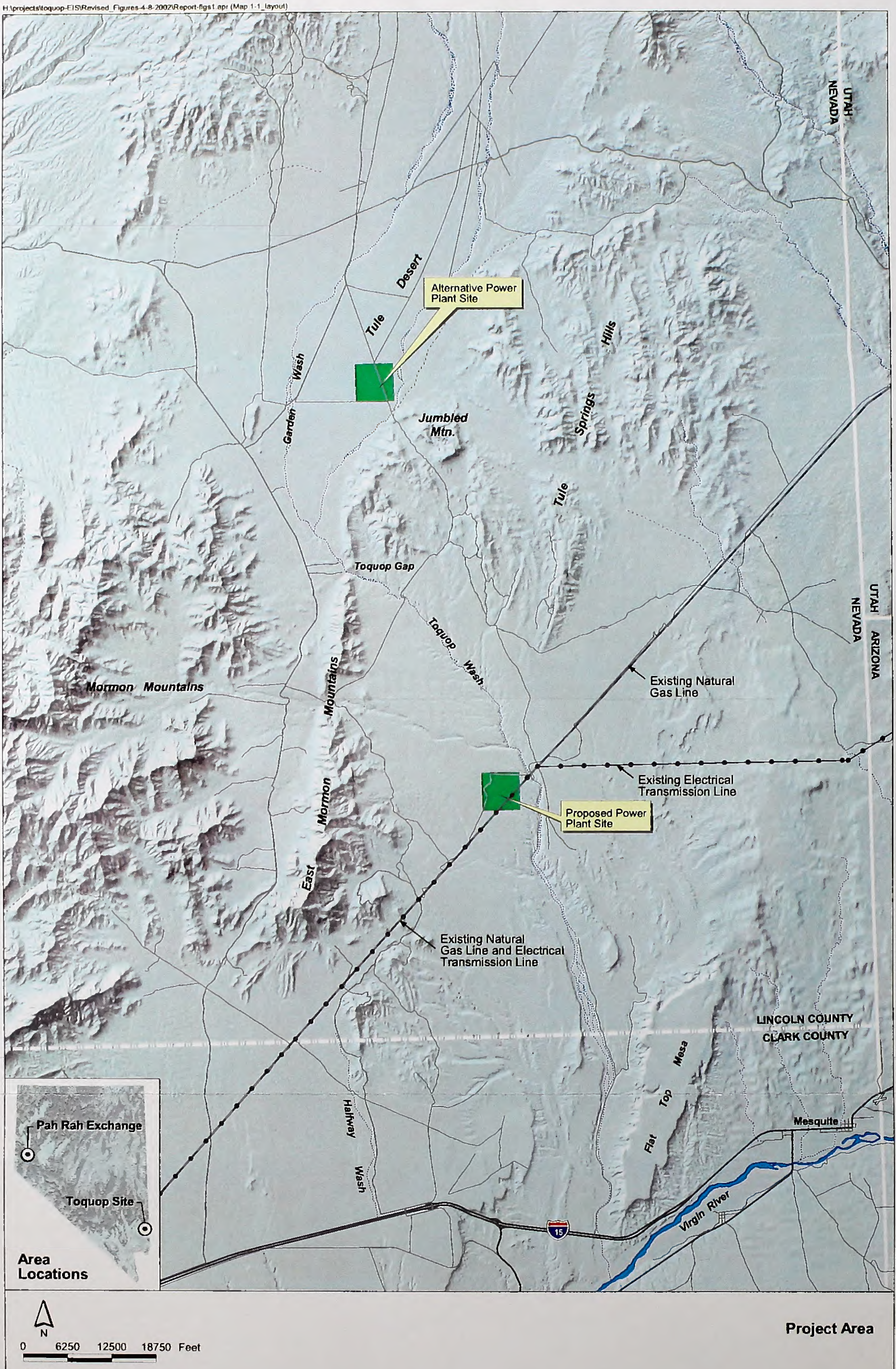

Project Area

Source:
1:100,000 Vector Linework - BLM Nevada.

Map 1-1

CH2MHILL

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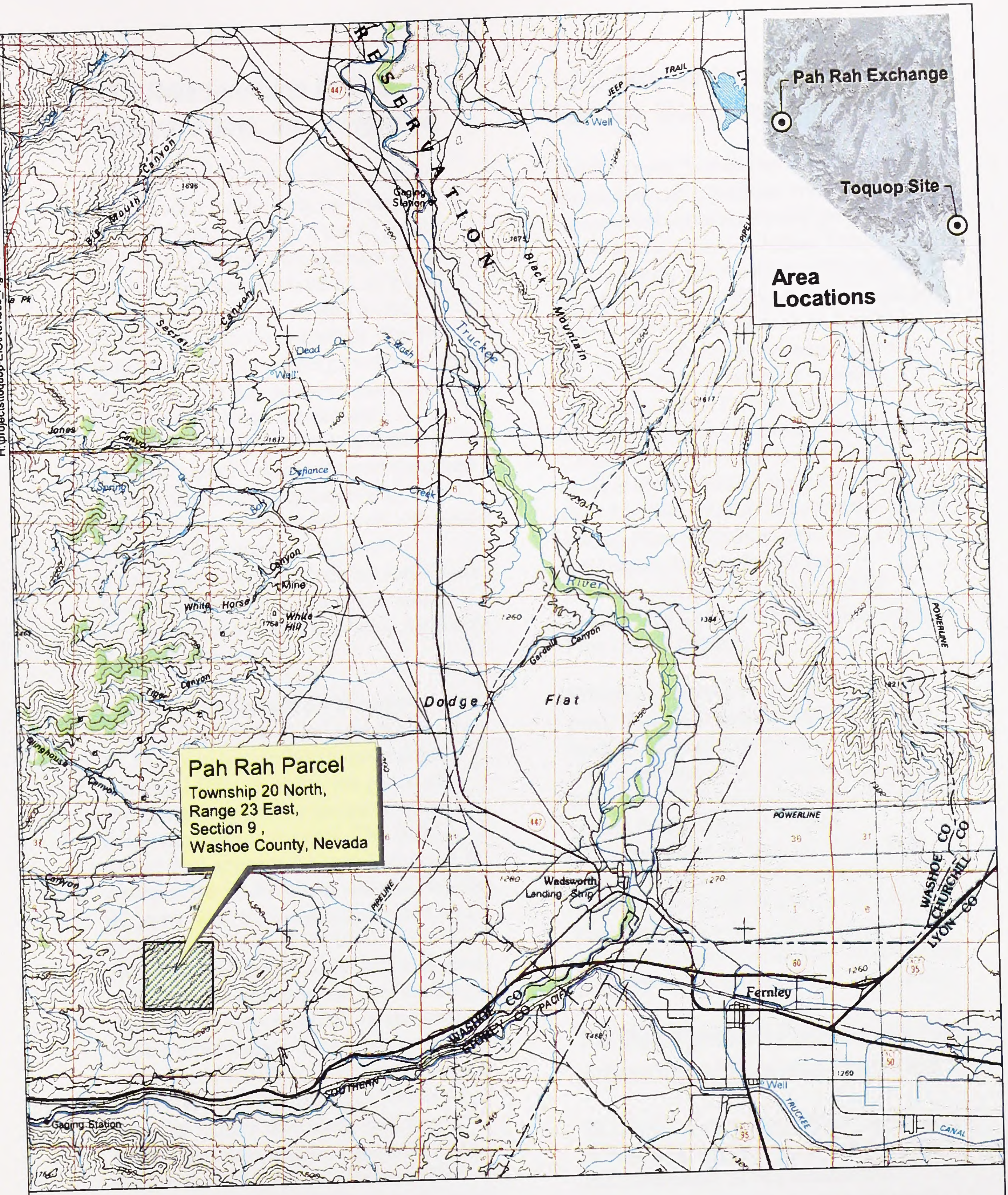

Vicinity Map of the Pah Rah Parcel

N

0 5000 10000 Feet

Source:
Maptech 1:24,000 Scanned Topo
Maps

Map 1-2

CH2MHILL

1.5.2 Relationships to BLM Policies, Plans, and Programs

The BLM is responsible for managing lands needed for the Toquop Energy Project. Toquop Energy's use of public land in the Caliente Management Area requires conformance with BLM's land management policies, as well as the FLPMA of 1976 (as amended). The BLM must review Toquop Energy's development plans to ensure that adequate provisions are included to: prevent unnecessary degradation of federal lands and their resources; ensure reclamation of disturbed areas; and ensure compliance with applicable state and federal laws. Approved BLM land use plans in adjacent administrative units include the *Las Vegas RMP, Arizona Strip Field Office RMP*, *Virgin River MFP*, and the *Nellis Air Force Range Resource Plan.*

In order to implement the Proposed Action or any of the other action alternatives, the BLM would be required to amend the Caliente MFP to identify the parcel of public land needed for the power plant as being suitable for disposal. The BLM would then approve the land exchange. In addition, the BLM would issue ROWs for 42 years—covering the construction and expected operational life of the project—for the access roads, utility corridors, and well sites. An option to the land exchange would be to keep all public lands needed for the project under BLM management and to issue ROWs for the power plant site as well as the linear facilities. This option does not require amending the Caliente MFP, but it does require compliance with NEPA and is, therefore, addressed in *Chapter 4, Environmental Consequences*, of this document.

1.5.3 Relationships to Non-BLM Policies, Plans, and Programs

The Proposed Action and other action alternatives are consistent with approved resource-related policies and programs of other federal agencies, Indian Tribes, local governments, and the State of Nevada. Approved land use plans for other adjacent federal administrative units include the *Desert Wildlife Range Management Plan.* Plans approved by adjacent counties include the *Clark County Desert Conservation Plan* (Nevada), the Lincoln County Policy Plan for Public Lands, a chapter of the *Nevada Statewide Policy Plan for Public Lands*, the *Lincoln County Master Plan Evaluation and 1992 Update*, the *Lincoln County Public Land Management and Use Plan*, and the Washington County Habitat Conservation Plan (HCP) (Utah).

Effects of the land exchange that would place about 640 acres of BLM-managed lands in Lincoln County in private ownership and on the Lincoln County tax roles would be consistent with a resolution passed by the Lincoln County Commissioners on June 20, 1994. That resolution opposed land exchanges that either take land off of county tax roles or place land into a tax exempt status. The proposed project would result in additional property tax revenues for Lincoln County.

1.6 Management Framework Plan Amendment Process Overview

The land use planning process, as mandated by FLPMA, requires the BLM to solicit and incorporate public input in the management of public lands, while still complying with the laws and policies established by Congress and the Executive Branch of the federal government.

Amendments to approved land use plans are developed using the planning process described in the basic steps described in the following text.

1.6.1 Identification of Issues

Issues drive the plan amendment process and indicate concerns that the BLM and the public may have regarding the management of specific resources in a planning area. An issue is defined as an opportunity, conflict, or problem pertaining to the management of public lands and associated resources. Identification of issues orients the planning process so that interdisciplinary analysis and documentation are directed toward resolution of those issues.

In order to implement the Proposed Action or other action alternatives and the associated land exchange being evaluated in this DEIS, the BLM must amend the Caliente MFP. This amendment would provide the legal mechanism for identifying and approving the exchange of privately held land (the Pah Rah parcel) for a parcel of publicly held land in Lincoln County on which the power plant would be located. The BLM would not be required to amend the Caliente MFP if the option of issuing ROWs rather than approving the proposed Pah Rah/Toquop land exchange is selected. The BLM must comply with the provisions listed in *Section 1.7, Applicable Laws and Regulations and Authorizing Actions and Permits*, of this DEIS for the land exchange to occur.

This amendment of the Caliente MFP constitutes a single-issue planning document that addresses the effects of the proposed land exchange in Lincoln County, Nevada. It responds to the following planning question: what effects, if any, on physical, biological, social, and economic resources will result from the disposal of public lands?

1.6.2 Development of Planning Criteria

Planning criteria are formulated to guide the development of a land use plan amendment and the evaluation of the Proposed Action and alternatives. The criteria are derived from laws; Executive Orders; regulations; planning principles; BLM guidance; consultation with interest groups and the general public; and available resource information for the area. Table 1-1 lists the planning criteria for the Toquop Land Disposal Amendment to the Caliente MFP.

1.6.3 Inventory and Data Evaluation

Using the planning criteria and focusing on the proposed land exchange, BLM specialists review and evaluate available data. These data include results of field examinations, published and unpublished studies, and consultations with individuals and staff from other agencies and organizations.

1.6.4 Analysis of the Existing Condition

An analysis of the existing condition and capabilities of resources within the land parcels that would be exchanged is contained in this DEIS. The analysis provides the database for developing and evaluating alternatives and is generally incorporated into the draft Plan Amendment as the Affected Environment, and to some extent, the No Action Alternative.

TABLE 1-1
Planning Criteria for the Toquop Land Disposal Amendment to the Caliente MFP

Comply with applicable laws, Executive Orders, and regulations listed in *Section 1.7.1 Applicable Laws and Regulations* and Table 1-2 of this document.

Management direction within the existing Caliente MFP, except for the proposed parcel of publicly administered land in Lincoln County to be exchanged for the privately owned Pah Rah Range parcel in Washoe County, will remain in effect and be unchanged by this amendment.

Use a systematic interdisciplinary approach to achieve integrated consideration of physical, biological, social, and economic aspects of disposal of the Toquop parcel.

Weigh short-term and long-term benefits and detriments to Lincoln County.

Coordinate BLM resource inventory, planning, and management activities in the amended Caliente Planning Unit with the resource planning and management programs of other federal agencies, state and local governments, and Indian Tribes, to the extent consistent with applicable laws.

Rely on available inventories and existing resource data for the proposed exchanged Lincoln County parcel to reach sound management decisions.

Define any BLM-administered critical habitat for federally protected species within the proposed exchanged Lincoln County parcel.

Develop and implement management actions on lands adjacent to the proposed Lincoln County parcel, as appropriate, to accomplish the goals and objectives of recovery plans for any federally listed species.

When public land acreage is no longer available for grazing, there is an implied reduction to livestock grazing. Actual reductions in livestock grazing may or may not occur as a result of this proposed land exchange, depending on whether or not current management practices can facilitate the change in public land that remains available for livestock grazing.

The U.S. Fish and Wildlife Service (FWS) will issue a Biological Opinion (BO) on the proposed Caliente MFP Amendment that will address the management of land uses in the acquired Pah Rah parcel and the proposed Lincoln County exchanged parcel, and their adequacy to contribute to achieving recovery and delisting objectives for federally listed species.

1.6.5 Formulation of Alternatives

On the basis of the issues, planning criteria, and concerns raised during scoping, the Proposed Action and two other comprehensive action alternatives are developed for consideration. The No Action Alternative is required by law and represents a continuation of present activities. The Proposed Action and each of the other action alternatives must meet the purpose and need for action and address the issues, while emphasizing different management. For this project, several alternatives were considered but eliminated from detailed analyses. These are described in *Chapter 2, Section 2.6, Alternatives Considered but Eliminated from Detailed Analysis*, with a discussion of why they were not considered further.

1.6.6 Estimation of the Effects of Alternatives

In accordance with NEPA, the physical, biological, social, and economic effects of implementing the Proposed Action and each alternative are estimated in order to allow for a comparative evaluation of impacts (see *Chapter 4, Environmental Consequences*).

1.6.7 Selection of the Preferred Alternative

The Ely Field Manager recommends a Preferred Alternative to the Nevada State Director, based on the issues and information identified through the planning process; coordination and consultation with other entities; and the impact analyses of the Proposed Action and alternatives. This Draft Toquop Land Disposal Amendment to the Caliente MFP/DEIS is then distributed to the public, including other government agencies and interest groups, for a 90-day review and comment period.

1.6.8 Selection of the Proposed Plan Amendment

Following the public review and comment period on this draft document, the Ely Field Manager recommends a Proposed Caliente MFP Amendment to the Nevada State Director. Based on an evaluation of the public comments, the BLM may retain the Preferred Alternative or select a different alternative from the range of alternatives identified in the Draft Plan Amendment. The Proposed Toquop Land Disposal Amendment to the Caliente MFP/Final EIS will be filed with the Environmental Protection Agency (EPA) and distributed to the public for review.

1.6.9 Monitoring and Evaluation

Monitoring and evaluation would be conducted at 5-year intervals for the Caliente MFP. These data would be used to determine the effectiveness of the plan amendment in achieving the desired results; to ensure that Best Management Practices (BMPs), Standard Operating Procedures (SOPs) and mitigation measures are satisfactory; and to ascertain whether there have been changes in related plans of other federal, state, or local governments. Any information gained would be incorporated into future planning, including other amendments or revisions to the Caliente MFP.

1.7 Applicable Laws and Regulations and Authorizing Actions and Permits

1.7.1 Applicable Laws and Regulations

Table 1-2 lists laws and regulations potentially applicable to the Proposed Action and other action alternatives.

1.7.2 Permits and Approvals

Table 1-3 lists federal, state, county, and other permits and approvals that may be needed to implement the Proposed Action or other action alternatives.

TABLE 1-2
Laws and Regulations that may Apply to the Proposed Action and Other Action Alternatives of the Toquop Energy Project

National Environmental Policy Act (NEPA) 42 USC 4321 et seq.
Council on Environmental Quality (CEQ) general regulations implementing NEPA (40 CFR Parts 1500-1508)
Department of the Interior's (DOI) implementing procedures and proposed revisions (August 28, 2000, Federal Register)
Bureau of Land Management's (BLM) NEPA Handbook H-1790-1 (1988)
National Historic Preservation Act (NHPA) and regulations implementing NHPA 16 USC 470 et seq.
Antiquities Act of 1906 16 USC 431 et seq.
Archeological Resources Protection Act, as amended (ARPA) 16 USC 470aa et seq.
Native American Graves Protection and Repatriation Act of 1990 (NAGPRA)
Clean Air Act (CAA) 42 USC 7401 et seq.
Clean Water Act (CWA) 33 USC 1251 et seq.
Endangered Species Act (ESA) 16 USC 1531 et seq.
Noise Control Act of 1972, as amended (NCA) 42 USC 4901 et seq.
Occupational Safety and Health Act (OSHA) 29 USC 651 et seq. (1970)
Pollution Prevention Act of 1990 (PPA) 42 USC 13101 et seq.
Safe Drinking Water Act (SDWA) 42 USC s/s 300f et seq. (1974)
Migratory Bird Treaty Act (Migratory Bird Guidance) 16 USC 703–711 Executive Order January 1, 2001
NEPA, Protection and Enhancement of Environmental Quality Executive Order 11512
National Historic Preservation Executive Order 11593
Floodplain Management Executive Order 11988
Protection of Wetlands Executive Order 11990
Federal Compliance with Pollution Control Standards Executive Order 12088
Environmental Justice Executive Order 12898
Indian Sacred Sites Executive Order 13007
American Indian Religious Freedom Act of 1978 (42 USC 1996)
Consultation and Coordination with Indian Tribal Governments Executive Order 13084
Invasive Species Executive Order 13112
Memorandum for the Heads of Executive Departments and Agencies (signed by President Clinton on April 29, 1994)
Responsibilities, and the Endangered Species Act, Secretarial Order 3206 (June 5, 1997)
Federal Land Policy and Management Act of 1976 (FLPMA) 43 USC 1701 et seq.
Federal Land Exchange Facilitation Act of 1988 (FLEFA), amended FLPMA
BLM land exchange regulations 43 CFR 2200
BLM right-of-way regulations 43 CFR 2800

TABLE 1-3
Federal, State, County, and Other Permits and Approvals that may be Needed to Implement the Proposed Action or Other Action Alternatives of the Toquop Energy Project

Federal Permits and Approvals
Bureau of Land Management NEPA Record of Decision for Proposed Action
Bureau of Land Management Rights-of-Way and Temporary Use Permits for water pipelines, transmission lines, access roads, gas pipeline, and other ancillary approvals
Bureau of Land Management Amendment of the Caliente Management Framework Plan and Planning Document
U.S. Fish and Wildlife Service, Endangered Species Act Section 7 Consultation and Biological Opinion
U.S. Army Corps of Engineers, Section 404/Section 10 Permit
Acid Rain (Title IV CAA) Permit
U.S. Environmental Protection Agency, Region IX, Title V (CAA) Operating Permit
U.S. Environmental Protection Agency, Section 402 National Pollutant Discharge Elimination System Notification for Stormwater Management during Construction
U.S. Environmental Protection Agency, Section 402 National Pollutant Discharge Elimination System Notification for Stormwater Management during Operation
State of Nevada Permits and Approvals
Nevada State Historic Preservation Office (SHPO), Section 106 review and concurrence, per National Historic Preservation Act for BLM lands, per protocol between BLM and Nevada SHPO
Nevada Division of Wildlife, Region 3 Project Review: Wildlife and Habitat Consultation for disturbance on BLM land
Temporary Discharge Permit—Nevada Division of Environmental Protection, Bureau of Water Pollution Control
Nevada Public Utility Commission Utility Environmental Protection Act
Nevada Division of Forestry, Native Cacti and Yucca Commercial Salvaging and Transportation Permit
Nevada Division of Environmental Protection, Section 401 Water Quality Certification
Water Right Permit-State Engineer—Nevada Department of Water Resources
Prevention of Significant Deterioration Program Major Source Permit—Nevada Department of Environmental Quality
Dust Control Permit— Nevada Department of Environmental Quality
Ground Water Discharge Permit— Nevada Division of Environmental Protection, Bureau of Water Pollution Control
Nevada Department of Transportation Encroachment Permit
Lincoln County and Clark County Permits and Approvals
Lincoln County Master Plan Amendment, Zone Change, and Special Use Permit
Grading permits for power plant, water pipeline, wellfield, and access road on BLM land
Clark County Multiple Species Habitat Conservation Plan

TABLE 1-3
Federal, State, County, and Other Permits and Approvals that may be Needed to Implement the Proposed Action or Other Action Alternatives of the Toquop Energy Project

Other Permits and Approvals
Kern River Gas Transmission Company Encroachment and Approval
Approval for interconnection with the Navajo-McCullough Electric Transmission Line

1.8 Interrelated Projects

CEQ guidelines for the preparation of EISs require that cumulative impacts be addressed in addition to direct and indirect impacts. Cumulative impacts are those incremental impacts that would result from the effects of the Proposed Action or action alternatives when added to the effects of other past, present, and reasonably foreseeable projects. The BLM recognizes the need for a thorough analysis of potential cumulative effects, not only from power plant siting activities, but from other development activities as well.

This section identifies large interrelated projects whose cumulative impacts may potentially extend across a broad range of the resource categories being assessed in this document (see Map 1-3). Each project has been evaluated to determine if it is sufficiently defined (reasonably foreseeable) to be: 1) relevant to potential impacts; 2) within the project area of influence; and 3) of a magnitude that could potentially result in a cumulative impact. The cumulative effects, if any, of the projects listed below are evaluated in *Chapter 4, Environmental Consequences*, together with any other projects not listed here whose effects would be very resource-specific. Large, interrelated projects potentially considered in the cumulative impacts analysis include the following:

- Sale and build-out of the Mesquite Land Act property
- Moapa/Paiute Energy Center
- Meadow Valley Generating Project
- Sale and build-out of the Lincoln County Land Act property (13,500 acres)
- Kern River Pipeline Expansion

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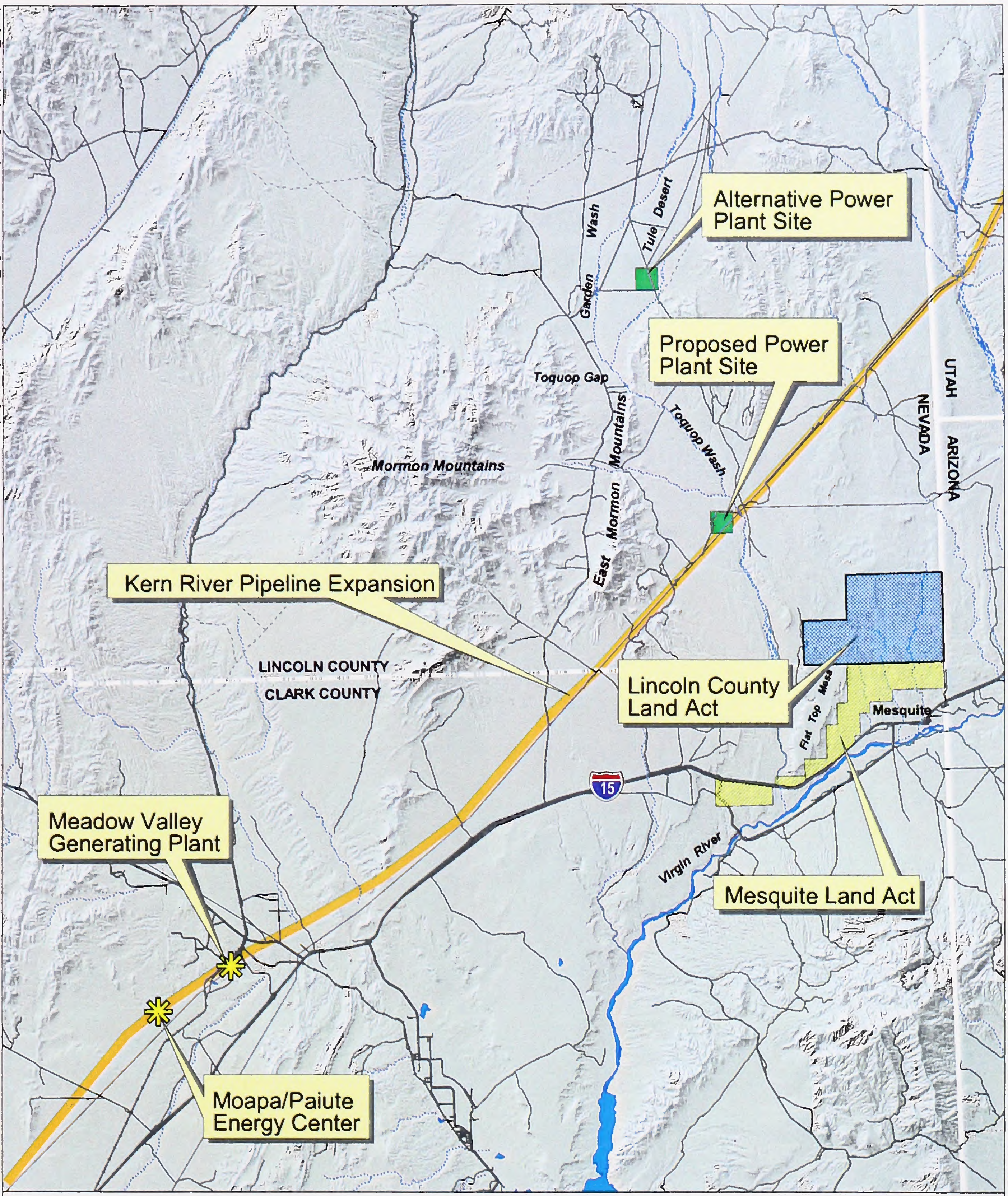

N

0 3 6 Miles

Interrelated Projects

Source:
1:100,000 Vector Linework - BLM Nevada

Map 1-3

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Chapter 2

Description of Proposed Action and Alternatives

Chapter 2.0 Description of Proposed Action and Alternatives

2.1 Introduction

This chapter describes the Proposed Action, two other action alternatives, and the No Action Alternative for the Toquop Land Disposal Amendment to the Caliente MFP and Toquop Energy Project. They are analyzed in detail in *Chapter 4, Environmental Consequences*, of this document and include the following:

- Proposed Action (Caliente MFP Amendment, Toquop Land Exchange, and/or Southern Power Plant Site ROW, Western Utility Alignment ROW, wellfield ROW, and access road ROW)
- Alternative 1 (Caliente MFP Amendment, Toquop Land Exchange, and/or Southern Power Plant Site ROW, Eastern Utility Alignment ROW, wellfield ROW, and access road ROW)
- Alternative 2 (Caliente MFP Amendment, Land Exchange and/or Northern Power Plant Site ROW, Eastern Utility Alignment ROW, wellfield ROW, and access road ROW)
- No Action Alternative

This chapter also describes alternative fuels, plant locations, and cooling systems that were considered during project formulation, but eliminated from detailed analysis.

The Proposed Action and each action alternative include the following project actions and features:

- Amend the Caliente MFP, exchange BLM-managed public land for a privately owned parcel of land, and issue ROWs by the BLM for Toquop Energy Project construction and operation
- Construct, operate, and maintain a 1,100-MW natural gas-fired electric power generating plant on one of two candidate plant sites with an expected life of 42 years
- Develop a wellfield in the Tule Desert to meet the water needs of the power plant
- Develop the linear infrastructure necessary to connect the power plant to the new water source, to existing natural gas and electric transmission lines serving the region, and to site access facilities

The Proposed Action and Alternative 1 differ primarily in the location of the utility alignment (western vs. eastern). The Proposed Action and Alternative 2 differ primarily in the location of the power plant site (southern vs. northern) and, therefore, the parcel of BLM-managed public land to be exchanged. Maps 2-1, 2-2, and 2-3 show the locations of prominent features associated with the Proposed Action, Alternative 1, and Alternative 2, respectively. As noted in Chapter 1, an option to the Proposed Action, Alternative 1, and Alternative 2, as described here, is for the BLM to issue ROWs for all project features rather than amend the Caliente MFP and approve the proposed land exchange. This option is addressed in *Chapter 4, Environmental Consequences*.

The No Action Alternative represents the status quo—not approving or implementing the Proposed Action or either of the action alternatives. Analysis of the No Action Alternative is required by NEPA guidelines.

The Proposed Action and alternatives were developed following public information meetings in Caliente and Mesquite, Nevada, and a scoping meeting in Las Vegas, Nevada, during July and August 2001. Comments received during those meetings and during the public scoping comment periods for this MFP Amendment/DEIS were considered in formulating the Proposed Action and alternatives. In addition, meetings were held with the U.S. Fish and Wildlife Service (FWS), local and regional staff of the BLM, and technical staff of the project proponents—Toquop Energy and NLRC—to aid in formulating the Proposed Action and alternatives.

Based on these public comments and meeting discussions, the BLM decided to combine the Toquop Energy Project DEIS with a related Environmental Assessment (EA) that BLM's Carson City Field Office had been preparing for the proposed Pah Rah/Toquop Land Exchange. That EA had been evaluating the exchange of approximately 640 acres of private land owned by the NLRC in the Pah Rah Range in Washoe County for a similarly valued, BLM-managed parcel of public land near the Toquop Wash in Lincoln County. Public scoping meetings on the proposed land exchange were held in Mesquite and Reno, Nevada, during July 2001. The proposed land exchange is now being evaluated as part of the Proposed Action and Alternative 1 in this DEIS. The separate EA process for the proposed Pah Rah/Toquop land exchange has been discontinued. In addition, BLM elected to initiate amendment of the Caliente MFP.

A different land exchange would occur under Alternative 2. Under this alternative, the same privately owned parcel in Washoe County would be exchanged for a parcel of BLM-managed public land approximately 12 miles north-northwest of the Toquop Wash plant site. This alternative site would be adjacent to and contiguous with the proposed wellfield in the Tule Desert. That wellfield is necessary for the Proposed Action and both action alternatives.

This proposed land exchange is part of the Proposed Action and action alternatives being addressed in this Draft Caliente MFP Amendment/DEIS. To proceed with the land exchange, the public land to be disposed of must be identified in the Caliente MFP as being suitable for disposal through sale or exchange. It has been determined that additional analysis is needed in the Caliente MFP for the 640 acres of public land that have been identified for exchange under the Proposed Action or action alternatives. Therefore, this document contains a focused Plan Amendment that addresses the proposed land exchange. The Pah Rah section of land to be acquired already meets the criteria for land acquisition in the Lahonton RMP, which is contained within the Consolidated RMP developed and administered by the BLM's Carson City Field Office. Therefore, no amendments to those RMPs are needed. If a land exchange could not be completed, the project might optionally proceed by building the power plant on public land with the issuance of appropriate ROWs from the BLM, and no amendment required for the Caliente MFP.

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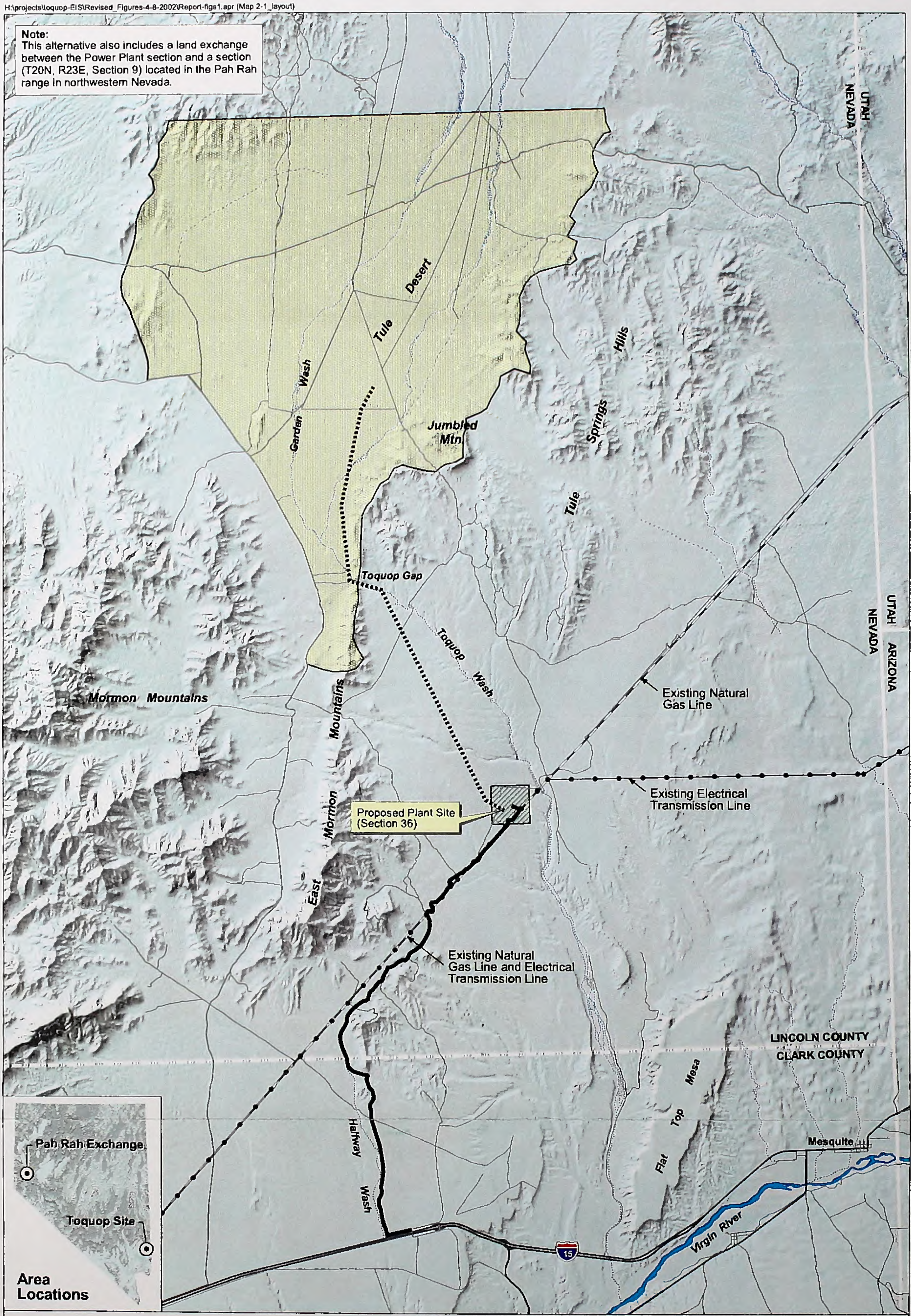


Note:
This alternative also includes a land exchange between the Power Plant section and a section (T20N, R23E, Section 9) located in the Pah Rah range in northwestern Nevada.

Source:
1:100,000 Vector Linework - BLM Nevada,

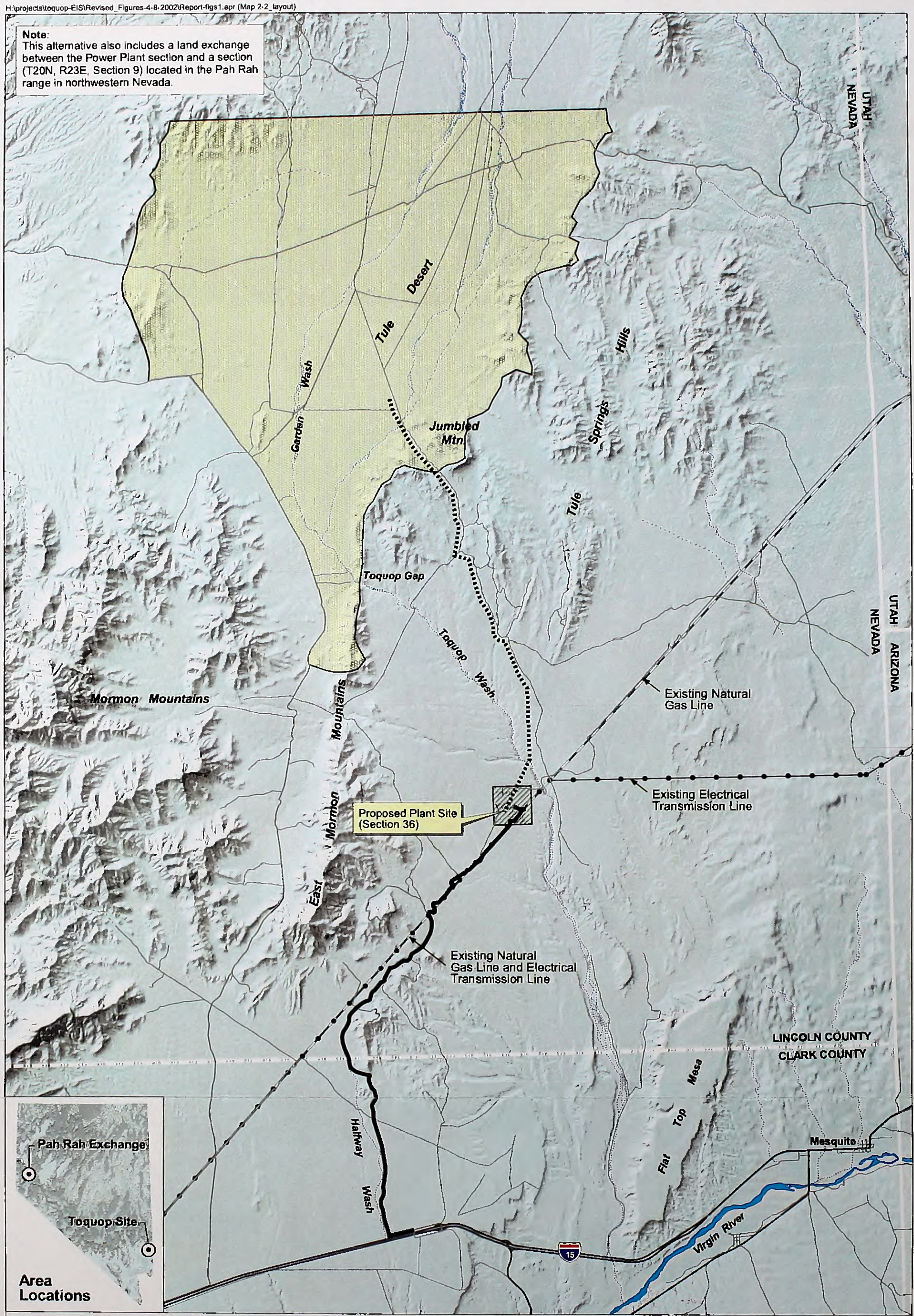
Legend
- ▨ Wellfield
- ━ Access Road
- ┅ Water Pipeline

Toquop Energy Project
Proposed Action

Map 2-1

CH2MHILL

Note:
This alternative also includes a land exchange between the Power Plant section and a section (T20N, R23E, Section 9) located in the Pah Rah range in northwestern Nevada.



Source:
1:100,000 Vector Linework - BLM Nevada,

Legend

🟨 Wellfield

▬ Access Road

▪▪▪▪▪▪ Water Pipeline

Toquop Energy Project
Alternative 1

Map 2-2

CH2MHILL

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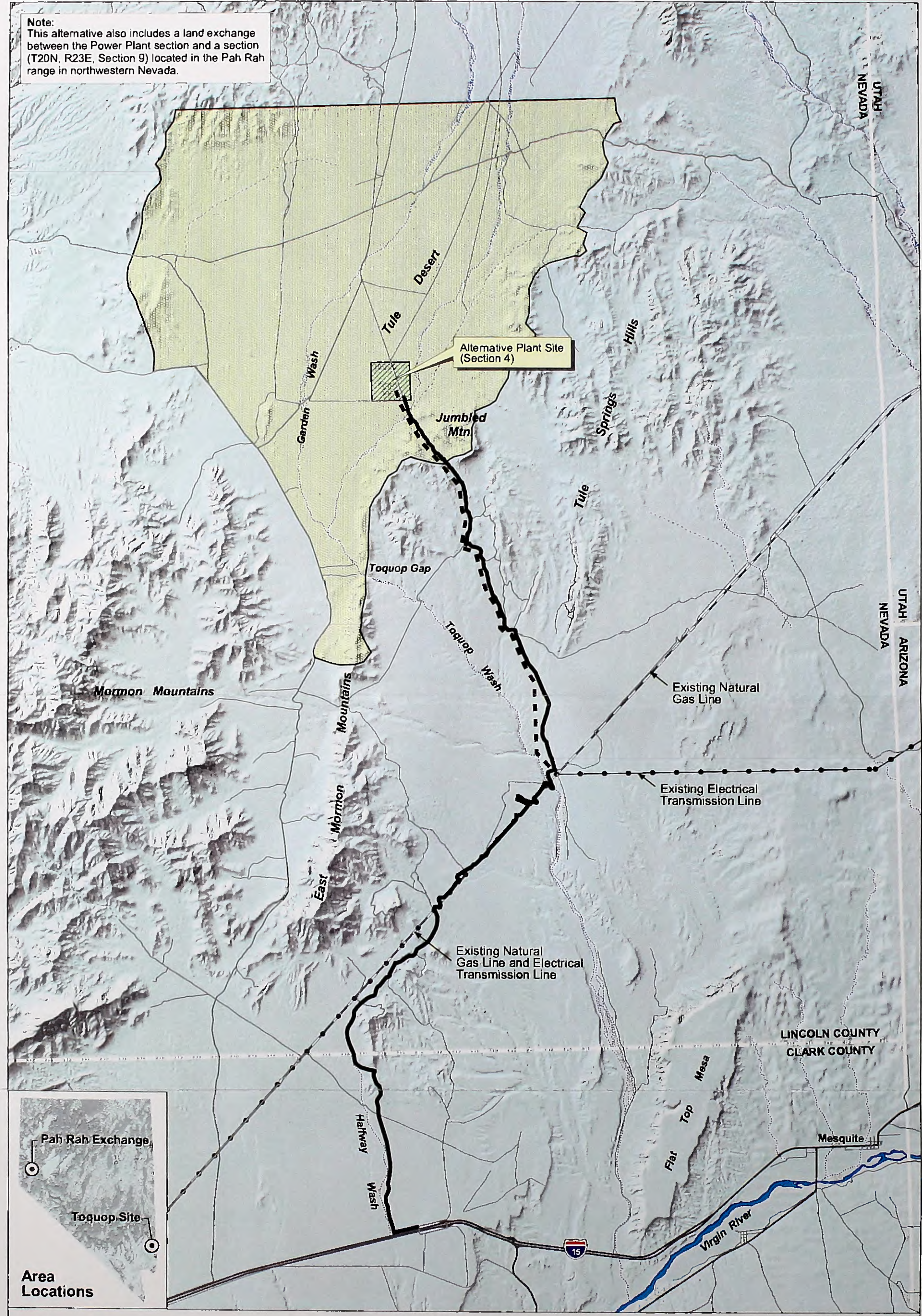
Note:
This alternative also includes a land exchange between the Power Plant section and a section (T20N, R23E, Section 9) located in the Pah Rah range in northwestern Nevada.



N

0 6250 12500 18750 Feet

Source:
1:100,000 Vector Linework - BLM Nevada,

Legend

🟩 Wellfield

━ Access Road

╍ Gas Pipeline and Transmission Line

Toquop Energy Project
Alternative 2

Map 2-3

CH2MHILL

2.2 Proposed Action

2.2.1 Description of BLM Actions

BLM actions that would occur under the Proposed Action include amending the Caliente MFP, completing the Pah Rah/Toquop land exchange, and issuing ROWs necessary for project construction and operation. These actions are briefly described in the following text.

2.2.1.1 Caliente MFP Amendment

The BLM would amend the Caliente MFP in order to identify lands as being suitable for disposal (under Section 203 or 206 of FLPMA) for the Proposed Action. *Section 1.6, Management Framework Plan Amendment Process Overview*, of this document describes the basic steps in the planning process that are used to amend management framework plans. These steps are being carried out as part of this Draft Caliente MFP Amendment/DEIS.

2.2.1.2 Pah Rah/Toquop Land Exchange

The BLM would approve the Pah Rah/Toquop land exchange with NLRC following the amendment of the Caliente MFP. Toquop Energy would then acquire the proposed exchanged parcel, which would serve as the power plant site under the Proposed Action, from NLRC. The Pah Rah/Toquop land exchange is described in *Section 1.4, Background; Section 2.1, Introduction;* and *Section 2.2.2.2, Land Exchange*, of this document.

2.2.1.3 ROWs

The BLM would issue ROWs necessary for the construction and operation of the Toquop Energy Project and related facilities. ROWs would be needed to construct and operate the power plant prior to or in lieu of formal execution of the Pah Rah/Toquop land exchange; drill deep ground water wells in the Tule Desert to provide water for the power plant; install a water pipeline and buried electric distribution power lines for the well pumps from the wellfield to the power plant; provide an access corridor from the power plant to the wellfield for maintenance activities; and provide an access road from existing roads to the power plant. ROWs would be required from the BLM that cover a larger footprint initially to accommodate construction activities that include drilling, trenching, paving, and material/equipment staging. Permanent ROWs would be necessary for the long-term operation and maintenance of all facilities located on BLM-managed public land.

2.2.2 Description of Project Area, Land Exchange, and Power Plant Site

2.2.2.1 Project Area

Map 2-1 depicts the project area and locations of prominent project features associated with the Proposed Action. The project would be located primarily in Lincoln County, Nevada, but portions of some project features, such as the access road to the power plant site, would be in Clark County, Nevada. Prominent landmarks in the project area include Interstate 15 (I-15) and the Virgin River to the south, the Tule Desert and Tule Spring Hills to the north, and the East Mormon Mountains west of the power plant site (see Map 2-1).

2.2.2.2 Land Exchange

This land exchange under the Proposed Action will exchange the 640-acre BLM-managed Toquop Wash parcel in Lincoln County (see *Section 2.2.2.3, Power Plant Site*) for a privately owned 640-acre parcel in Washoe County, Nevada. The private parcel of land is owned by NLRC and is located on a mesa at the southern end of the Pah Rah Range in Section 9, T20N, R23E. The Pah Rah parcel consists primarily of open, uninhabited land and is approximately 10 miles west of Fernley and 25 miles east of Reno. Maps 1-1 and 1-2 show the locations of the Toquop Wash and Pah Rah parcels within Nevada. This exchange will be completed as an equal-valued transaction based upon market values determined through federally approved appraisals.

For many reasons, it was determined that more benefit would be derived from an exchange of these parcels than by merely providing BLM ROW grants for the proposed power plant site and appurtenant facilities. The BLM Carson City Field Office desires to acquire this "checkerboard" land to address Washoe County's urban interface/open space issues by providing additional access to public land and resources, while providing watershed and resource (cultural and wildlife [sage grouse habitat]) protection from private development. Development would require new roads into this roadless parcel and would jeopardize these resources. On the other hand, the Ely Field Office wishes to dispose of selected Federal land to assist county and local governments with community expansion/ economic development opportunities. With an exchange, both the public and private sectors would receive benefits not supported by ROWs only.

All surface and mineral rights and interests would remain with the respective exchanged parcels and transfer to the new owners. No water rights are associated with either parcel and the existing utility rights-of-way on the Toquop parcel would be converted to "easements in perpetuity" should a land patent be issued. Public access would be maintained through the Toquop parcel on an existing access road or on approved access alignments that do not adversely affect the existing utility facilities.

Should this exchange be approved, the Pah Rah parcel would be managed by the BLM as provided in the Carson City Field Office CRMP, which states, "Initiate land exchanges with the Southern Pacific Railroad…to block in lands in the …Olinghouse Allotment(s)." This acquisition proposal also meets all the following Southern Washoe County Urban Interface Plan Amendment criteria for the Pah Rah area:

- Facilitate access to public lands and resources
- Provide resource protection
- Facilitate implementation of the CRMP
- Provide for a more manageable land ownership pattern
- Maintain or enhance public recreational uses and open space values

Washoe County supports this proposed exchange for the public benefits stated above, interests, and protection provided by BLM land use plans. Lincoln County supports this proposed exchange for the opportunities mentioned previously and improved tax base that would be afforded to the county, which is currently comprised of more than 98 percent federally controlled land. Private development, such as a power plant, would provide additional employment and associated economic opportunities in the surrounding area. Additional taxes afforded by this development would provide revenues to maintain existing public programs and to initiate new programs/services not financially viable at the present time.

2.2.2.3 Power Plant Site

The Proposed Action power plant site is in Section 36, T11S, R69E in Lincoln County, Nevada, on public lands administered by the Ely Field Office of the BLM. Toquop Energy would acquire the power plant site from NLRC following completion of the Pah Rah/Toquop land exchange between the BLM and NLRC. The site is approximately 12 miles north-northwest of Mesquite, 70 miles northeast of Las Vegas, 6 miles north of the Lincoln County/Clark County line, and 10 miles west of the Nevada/Utah/Arizona border. Map 2-1 shows the power plant site and associated project features, including the wellfield, water pipeline, and access road. Map 2-4 shows the detailed location of the proposed power plant site.

The 1-mile-square power plant site contains 640 acres of uninhabited public land near the Toquop Wash on the northern boundary of the Mojave Desert. The site is relatively flat, with a 2 percent slope from northwest to southeast, and varies in elevation from 2465 to 2590 feet above mean sea level. The entire site is within the Virgin River Hydrographic Basin (#222). The South Fork Toquop Wash runs within 3/4 mile of the site to the north, and the main stem Toquop Wash runs north/south approximately 1/4 mile east of the site. The Toquop Wash system receives runoff from the Mormon and East Mormon mountains located west and northwest of the site and drains to the Virgin River. The Kern River Natural Gas Pipeline and Navajo–McCullough Electric Transmission Line cross the southeast corner of the site (see Map 2-1).

2.2.3 Description of Project Features and Operation

2.2.3.1 General

Project features, their operation, and associated actions of the Proposed Action include the following primary elements:

- Amend the Caliente MFP to identify the southern plant site as suitable for disposal through sale or exchange
- Complete a land exchange between the BLM and NLRC to place the proposed plant site into private ownership
- Issue ROWs by the BLM for constructing and operating the power plant and all related facilities listed in the following bullets
- Construct and operate a 1,100-MW combined cycle, natural gas-fired electric generating plant, with connections to a natural gas pipeline and electric transmission line
- Drill up to an estimated 15 wells in the Tule Desert Basin (Hydrographic Basin #221) over the life of the project sufficient to produce an annual average flow of 3,800 gallons per minute (gpm) (7,100 gpm peak daily) of water for the power plant. It is estimated that the power plant could use up to 7,000 acre-feet of water per year.

- Construct and operate a 12.5-mile-long, 24-inch-diameter buried water pipeline extending from the wellfield in the Tule Desert, through Toquop Gap, to the power plant near the Toquop Wash
- Construct and operate a manifold collection system to interconnect the water output from the wellfield to a pressure-regulating water tank
- Construct and operate a pressure-regulating water tank located near the wellfield before the water pipeline to the power plant
- Construct and operate buried electric distribution power lines from the power plant to the well pumps
- Pave to a width of 24 feet and straightening sections of 14.4 miles of an existing dirt and gravel road (locally known as the Halfway Wash Road and utility corridor road) to produce an access road extending from I-15 to the plant site
- Provide a 12.5-mile-long access right-of-way along an existing dirt and gravel road for maintenance activities between the power plant and the ground water wellfield

The following sections discuss the project features and their operation, including the power plant facilities, road access and transportation, ground water wellfield, and water pipeline. BLM actions associated with these features, which include amending the Caliente MFP, facilitating the Pah Rah/Toquop land exchange, and issuing ROWs, were described in *Section 2.2.1, Description of BLM Actions*.

2.2.3.2 Power Plant Facilities

This section briefly describes how electric power would be produced at the power plant. This discussion is intended to familiarize readers with basic concepts and terminology and to promote a better understanding of topics discussed later in this DEIS.

Electricity can be generated commercially in several ways, but the common element is the turning of a generator. The source of power that turns the generator distinguishes the different types of power plants. Typical installations use either a diesel engine, a combustion turbine, and/or a steam turbine.

The proposed power plant employs combined cycle technology, which would use combustion turbine generators in series with heat recovery steam generators and a steam turbine generator. The exhaust heat from the combustion turbine generator is used in the heat recovery steam generator to produce steam. That steam would drive the steam turbine generator. Use of the original gas fuel energy for the combustion turbine generator and then using the exhaust heat from the combustion turbine generator (which otherwise would go to waste) to produce steam for the steam turbine generator increases the plant's overall efficiency when compared with a combustion turbine generator or steam turbine generator operating alone. Figure 2-1 presents a conceptual rendering of the proposed power plant.

The combustion turbine generators would be fueled by natural gas from the 36-inch-diameter Kern River Gas Pipeline, which passes directly through the southeast corner of the Toquop Wash plant site. This pipeline became operational in 1992 and

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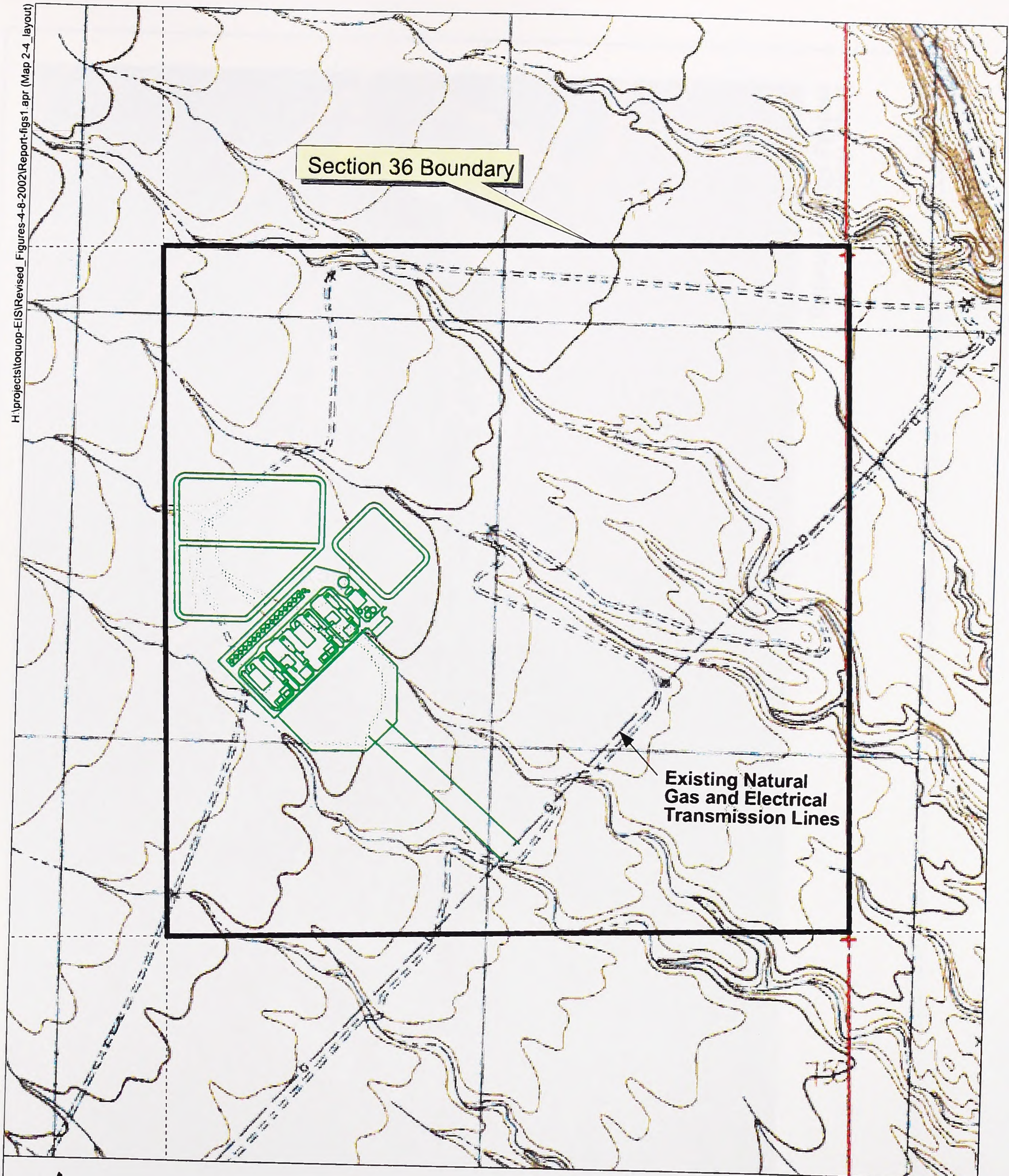
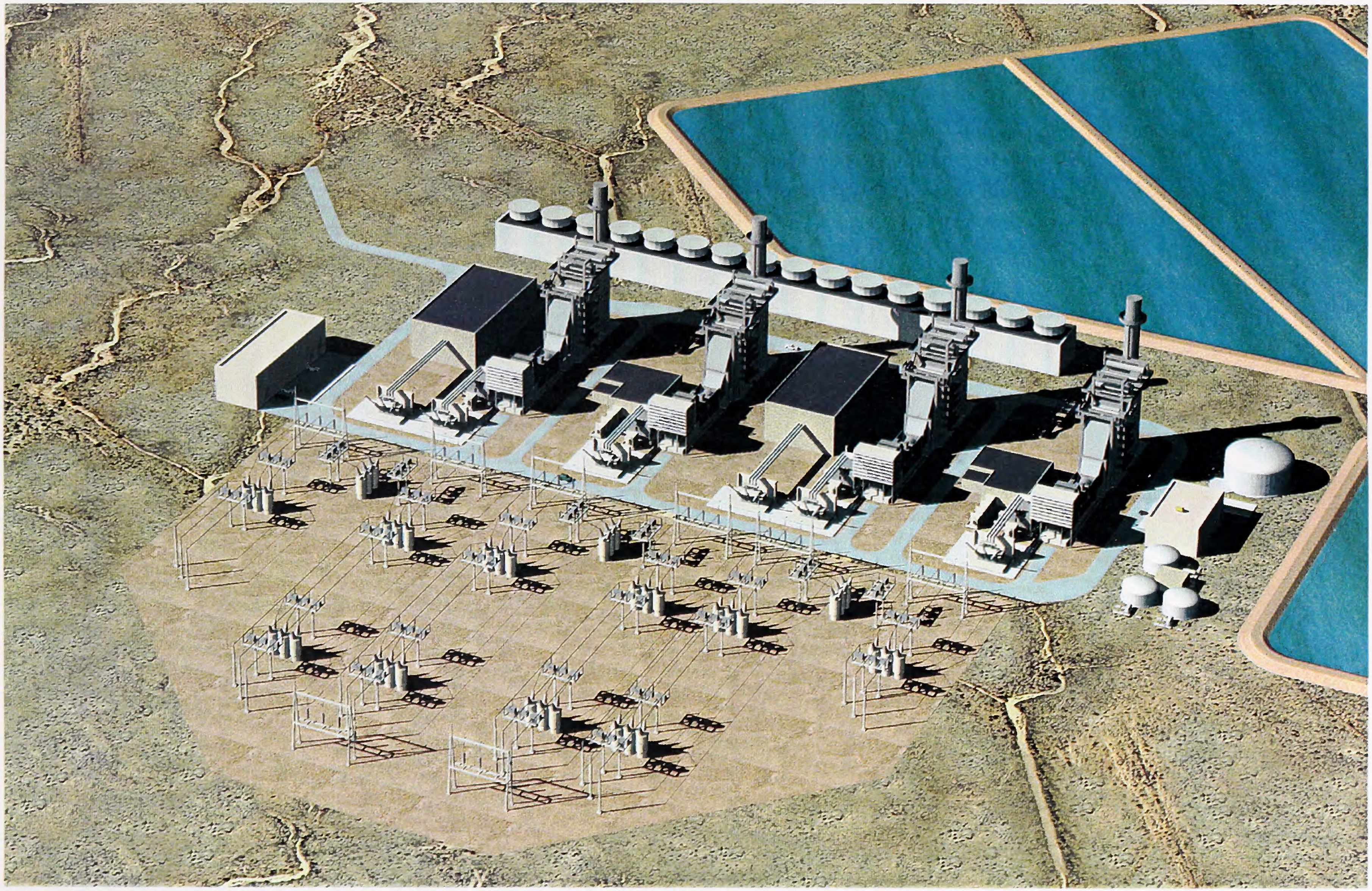


Toquop Energy Project Proposed Plant Site Proposed Action and Alternative 1 (Section 36)

Source:
Maptech 1:24,000 Scanned Topo Maps

CH2MHILL

Map 2-4



Toquop Energy Project
Power Plant

Figure 2-1

transports natural gas from southwestern Wyoming to southern and south-central California. A tap, meter station, and connective pipeline would be required as part of the project to provide natural gas to the plant. The pipeline meter and tap would be at the main line and would be accomplished without interruption to other natural gas customers.

The power plant would use four combustion turbine generators, four heat recovery steam generators with duct burners, and two steam turbine generators. In addition, two natural gas-fired auxiliary boilers would be used to provide startup steam to the steam turbines. The steam from the auxiliary boilers would not be used to generate electricity. Each combustion turbine generator would be composed of a combustion turbine fueled by natural gas, which would be connected to and drive a three-phase, alternating current generator. The hot exhaust of each combustion turbine generator enters an attached heat recovery steam generator. Each heat recovery steam generator is a large, three-pressure heat exchanger/steam generator that would use the hot combustion turbine generator exhaust gas to heat water into high-pressure steam. Natural gas burning duct burners would be included in the heat recovery steam generator to augment steam production during warm ambient temperature periods. The exhaust gas would enter the heat recovery steam generator at approximately 1,100 degrees Fahrenheit and pass through multiple banks of water-filled tubes, heating the water into low-, intermediate-, and high-pressure steam. The exhaust gas would pass through a series of emissions control systems and would be vented through an elevated exhaust stack that is 180 feet high. The combined cycle combustion turbines would be dry, low-nitrogen oxide, low-carbon monoxide combustors used in conjunction with selective catalytic reduction in the heat recovery steam generator to control nitrogen oxide emissions.

The steam produced in the heat recovery steam generators would be used to power two steam turbines, which would be connected to three-phase electrical generators. Duct firing within the heat recovery steam generators would increase steam production to increase the power production by the stream turbine. Given optimal conditions (operation of duct burners at designed maximum capacity), the energy center could produce up to 1,100 MW. The electric power would be transmitted from the power plant switchyard to the Navajo-McCullough Electric Transmission Line, which crosses the southeast corner of the plant site. This transmission line is northwest of and parallel to the Kern River Gas Pipeline corridor. Toquop Energy is pursuing a contract to interconnect with the transmission line. Adequate capacity is available on the line to transmit Toquop-produced energy.

After steam passes through the steam turbine, it would be condensed to liquid in the condenser and pumped back to the heat recovery steam generator to repeat the cycle. The condenser would be a large tube-and-shell heat exchanger that operates at a vacuum on the shell (steam) side. Cooling water would flow from the cooling tower through the condenser tubes, pick up residual heat from the steam, and return to the cooling tower. The cooling tower would be a direct-contact heat exchanger in which the cooling water would be sprayed directly into a moving air stream, evaporating a portion of the water to carry heat away from the condenser. In this process, the same water would be used for several cycles. As the well water circulates and evaporates in the cooling tower, the level of dissolved solids in the water would concentrate. A portion of the circulating water would be "blown down to waste" to remove dissolved solids from the circulating water and prevent scale formation on process heat transfer surfaces. This cooling tower blowdown would consist primarily of high concentrations of dissolved solids that occur naturally in the well water used as makeup to the cooling water system. Figure 2-2 shows a schematic of this combined cycle electric power production process.

While this would be a 1,100-MW plant, it is important to note that two-thirds of the power generated would come from the combustion turbines while one-third would come from the steam turbines. Therefore, water use and consumption would be equivalent to that of a 360-MW steam plant.

Blowdown from the steam cycle would go to a brine concentrator and then be further managed onsite using a geomembrane double-lined equalization pond and double-lined evaporation ponds. Each liner would be 60 mils thick. The onsite equalization pond would be managed to keep the water chemistry balanced for use in the cooling system. No wastewater would be discharged from the ponds to any surface water or offsite treatment facilities. Solids filtered or settled from the wastewater in the recycle process would be removed from the site regularly, and disposed of at an approved offsite disposal facility.

The power plant, switchyard, equalization and evaporation ponds, associated facilities, and a lay-down area would cover approximately 100 acres. This acreage would be surrounded by an 8-foot chain link fence that would enclose the following structures:

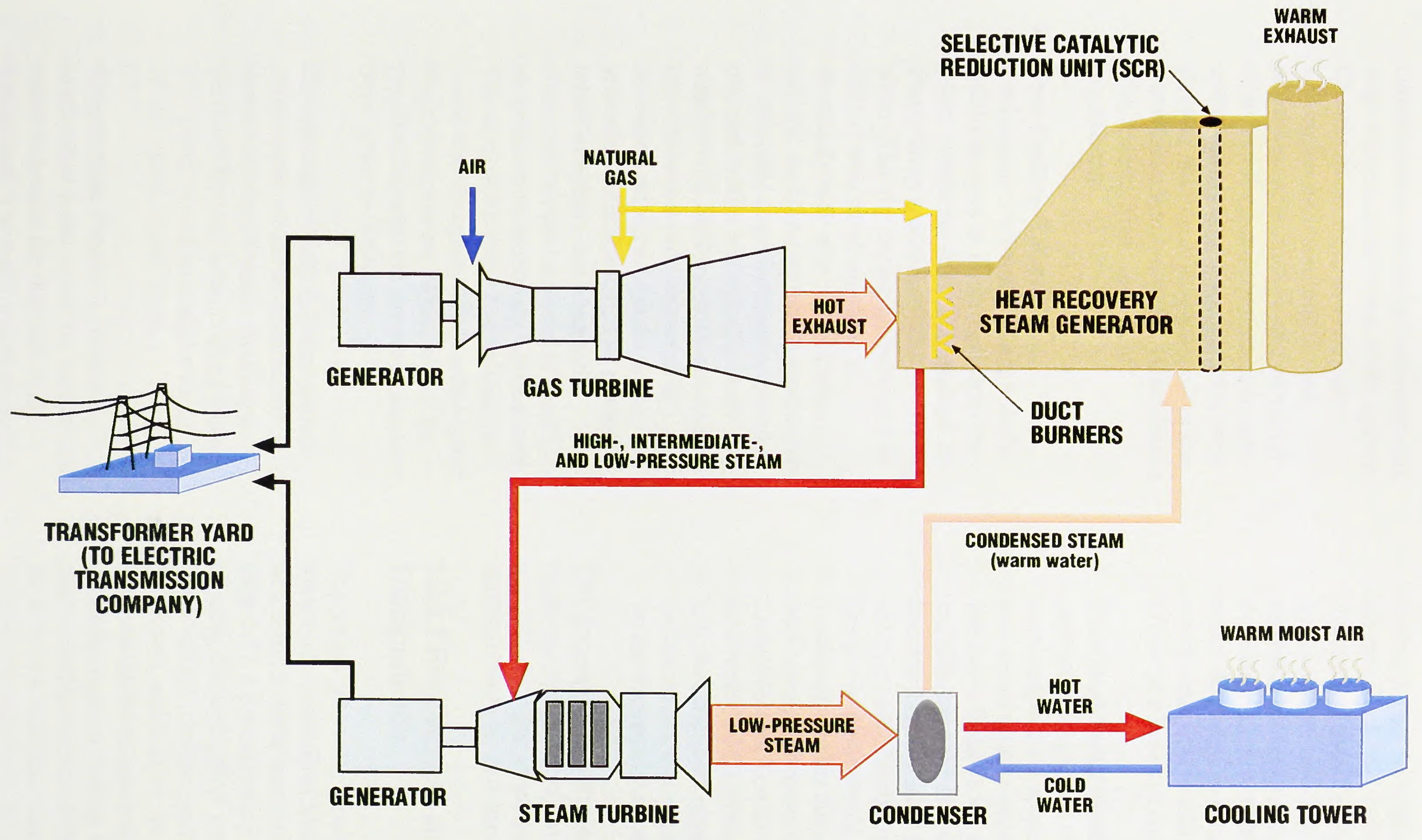
- **Four Combustion Turbine Generators.** These natural gas turbines would each be directly connected to an 18-kilovolt (kV), three-phase generator. Combustion gases from the turbines would exhaust into the heat recovery steam generator.

- **Four Heat Recovery Steam Generators.** These steam generators would use the heat of the gas turbine exhaust to produce low-, intermediate-, and high-pressure steam. The steam from each pair of heat recovery steam generators would be used to drive a steam turbine generator.

- **Four Combustion Turbine Heat Recovery Steam Generator Stacks.** These cylindrical stacks would be 180 feet high, 18 feet in diameter, and carry the 170- to 195-degree Fahrenheit heat recovery steam generator exhaust above surrounding buildings. An air quality sampling platform would be constructed on each stack for stack testing and combustion emissions equipment.

- **Two Steam Turbine Generators.** These steam turbines would use steam produced by the heat recovery steam generators to drive 18-kV, three-phase generators. The steam would exhaust into a condenser, return to its liquid state, and be recycled back into the heat recovery steam generators.

- **Condenser.** A large shell-and-tube heat exchanger would attach to the steam turbine exhaust side, which would condense exhaust steam from the steam turbine. The condensate would be recovered and chemically



WARM EXHAUST
SELECTIVE CATALYTIC REDUCTION UNIT (SCR)
AIR
NATURAL GAS
GENERATOR
GAS TURBINE
HOT EXHAUST
HEAT RECOVERY STEAM GENERATOR
DUCT BURNERS
TRANSFORMER YARD (TO ELECTRIC TRANSMISSION COMPANY)
HIGH-, INTERMEDIATE-, AND LOW-PRESSURE STEAM
CONDENSED STEAM (warm water)
WARM MOIST AIR
HOT WATER
COLD WATER
LOW-PRESSURE STEAM
GENERATOR
STEAM TURBINE
CONDENSER
COOLING TOWER

Combined Cycle Electric
Power Production Process

Figure 2-2

conditioned to minimize corrosion and scale formation for reuse in the system. Chemicals used (such as oxygen scavenger, amine solutions, and phosphate solutions) would be stored within spill containment areas in self-contained storage systems called totes (typical volume of 400 gallons) in the water treatment building in compliance with federal, state, and local regulations.

- **Two Cooling Towers.** Two mechanical-draft wet cooling towers would be used to reject heat from the steam condenser to the atmosphere by evaporating a portion of the circulating water. The circulating water would be treated with small amounts of chemicals such as scale inhibitors, sulfuric acid, and sodium hypochlorite to minimize scale formation, maintain pH, and inhibit biological growth, respectively. Sulfuric acid and sodium hypochlorite would be stored in aboveground vertical tanks within secondary containment. The other lesser inhibitors and treatment chemicals would be stored in totes located within secondary containment. The storage for these totes would be inside the storage building located near the cooling towers. Water would be recycled through the towers at least ten times prior to discharge.

- **Equalization Pond.** A 5-acre equalization pond would be constructed onsite to keep the water chemistry balanced for use in the cooling system. This pond would be sealed with a 60-mil-thick double liner.

- **Evaporation Ponds.** A 20-acre evaporation pond would be constructed onsite to handle the disposal of all wastewater. The pond would be sealed with a double liner. Each liner would be 60 mils thick. No wastewater would be discharged from the facility to any surface water or offsite treatment facilities which would be consistent with state requirements for a ground water discharge permit. Dry solids from water treatment would be disposed of offsite at a licensed landfill.

- **Electrical Switchyard.** Electricity generated by each of the four combustion turbine generators and the two steam turbine generators would be increased from 18 kV to 500 kV and transferred to the Navajo-McCullough Electric Transmission Line located on the plant site. Electricity produced at the power plant would be sold to the wholesale market through the Navajo-McCullough Electric Transmission Line (Western Transmission System). The Nevada-McCullough Transmission Line has adequate capacity to transmit the electricity that would be generated by the Proposed Action.

The Toquop Energy Project is seeking approvals to operate up to 24 hours per day, 365 days per year, and would require approximately 25 full-time employees.

2.2.3.3 Road Access and Transportation

The power plant site would be accessible from I-15 via the East Mesa Interchange, which is 13 miles west of Mesquite (see Map 2-1). Approximately 14.4 miles of an existing dirt and gravel road (Halfway Wash/utility corridor road) would be paved to a width of 24 feet, and some sections would be straightened to produce an access road extending from I-15 to the plant site. The construction right-of-way for this 14.4-mile-long access road would be quite variable in width and would occupy 246 acres. This access road presently occupies 30 acres. The net new construction right-of-way disturbance from the widened access road would be 216 acres. Staging areas required for road construction would total 20 acres and would be reclaimed. The long-term right-of-way for the access road would occupy 138 acres. The net new permanent impact within the long-term right-of-way would be 65 acres. No new roads would be required for site access.

This low-speed but serviceable road is the primary access for maintaining a microwave station, communications equipment optical fiber lines, natural gas pipelines, and electric transmission lines located on the southern end of the East Mormon Mountains. The Proposed Action would use this existing road as the primary site access. This would require that the road be regraded, a suitable base material installed, and then paved for all-weather use. The existing road would require straightening in some locations where it has very-small-radius turns. Some dry washes exist where culverts or other materials would be installed to prevent road damage during periods of excessive runoff. Minor improvements would be required on the frontage road at the I-15 interchange to handle large construction equipment and the largest components of the power plant itself.

The desert tortoise is a federally protected species under the terms of the Endangered Species Act (ESA). Measures to protect desert tortoise and their habitat are described in the terms and conditions of ROWs issued by the BLM and would be followed during road upgrading and use (see *Section 2.2.5, Best Management Practices and Standard Operating Procedures* and *Appendix A, Measures for Protecting Desert Tortoises and Their Habitat*, for detailed descriptions). These measures are especially important because this access road passes through the Mormon Mesa Area of Critical Environmental Concern (ACEC), so designated because of the presence of desert tortoise and their habitat.

2.2.3.4 Wellfield

Ground water is proposed for use in all power plant operations and for cooling water. Approximately 3,800 gallons per minute (gpm) of water would be required to supply the power plant under annual average design operating conditions. Because of higher cooling demands, the average water use during the summer months would be approximately 5,500 gpm (approximately 2,190 acre-feet of water from June through August). The peak daily use of water could require up to 7,100 gpm (31 acre-feet of water per day). It is estimated that the power plant would require up to 7,000 acre-feet of water per year. More than 90 percent of this water (approximately 6,300 acre-feet) would be used by an evaporative cooling tower system. The remainder would be filtered, if necessary, to provide service water, potable water, and water for the demineralized water treatment system. That system would supply the high-purity water needs of the heat recovery steam generators.

The Proposed Action includes the development of a wellfield in the Tule Desert Hydrographic Basin (#221) to supply ground water to the power plant. Although a significant amount of work has been completed to characterize the ground water resources (CH2M HILL, 2002), additional studies are currently underway to determine the exact number and location of these wells. For purposes of analysis in this DEIS it is assumed that up to 15 deep wells, each with a pump enclosed by a small building, would be required over the life of the project. A manifold system would interconnect the output from each of these wells to a single 24-inch-diameter buried pipeline. That pipeline and buried electrical distribution power lines in the same right-of-way would extend from the Tule Desert to the Toquop Wash plant site approximately 12 miles away.

Although the exact location of each well is not yet known, they would be spatially dispersed in the southern third of the Tule Desert (see Map 2-1). The wells would be located as close as possible (within 300 feet) to one of the several existing dirt roads that crisscross this area. The maximum disturbed surface area for each well would be approximately 1 acre. This would consist of approximately 1/3 acre for the new 300-foot-long access road and pipeline, which would have a 60-foot-wide construction right-of-way, and approximately 2/3 acre for construction activities at the well site. The total area disturbed would range up to 15 acres, depending on how many wells are drilled. Because the collection pipelines and associated electrical service lines would be located in existing roads, no new disturbance would result.

In addition to the wells and manifold system, a raw water storage tank of approximately 500,000 gallons (configuration and color to be determined during final design to blend with background conditions) would be built to maintain constant flow in the pipeline. This storage tank would be located above ground as close as possible to the production well farthest downstream and would feed water by gravity to the power plant. The maximum disturbed area for the storage tank would be 1 acre. An existing 12.5-mile-long road from the power plant site to the wellfield would be used occasionally to provide access for maintenance and monitoring of production wells.

Permanent water rights that would be required to supply up to 7,000 acre-feet of water per year from the Tule Desert wellfield necessary to operate the Toquop Energy Project have been jointly applied for by Vidler Water Company, Inc. (a sister company of NLRC) and Lincoln County. Toquop Energy would lease and use these water rights for the 42-year life of the project.

It is anticipated that a single monitoring well would be developed downgradient of the southernmost production well. This monitoring well would be adequate to assess effects of withdrawal from the deep aquifer. The maximum disturbed surface area for this well would be approximately 1 acre.

2.2.3.5 Water Pipeline

Ground water withdrawn from the Tule Desert wellfield would be pumped and gravity-fed through a 24-inch-diameter ductile iron or steel pipeline 12.5 miles to the power plant site. Pipeline capacity would only be sufficient for the Toquop Energy Project. The pipeline route does not follow existing roads except near the wellfield. The pipeline would run south-southwest for approximately 5 miles, crossing Sam's Camp Wash west of the East Mormon Mountains, and then proceed east approximately 3/4 mile through the Toquop Gap (Map 2-1). It would then turn south-southeast for approximately 6 miles directly to the plant site. The line would cross the South Fork Toquop Wash 1-1/2 miles north of the proposed plant site. The wash is approximately 80 feet deep at the proposed pipeline crossing point.

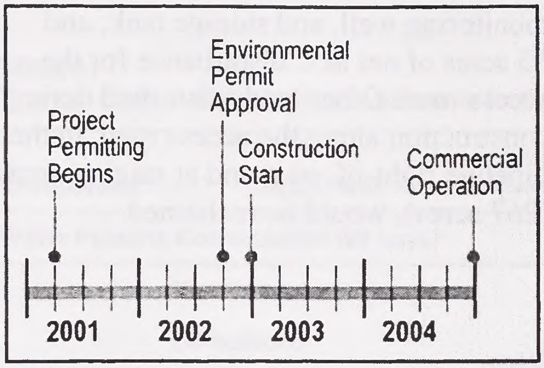
The pipeline would be buried deep, well below potential streambed scour, erosion, and exposure, and away from potential lateral bank migration. The potential for both scour and lateral bank migration would be studied further during final design to determine burial depth necessary to protect the pipeline from exposure and failure during floods. Open-cut construction techniques would probably preclude reestablishing the vertical wall in some sections of the canyon.

Steel pipe, if used, would be lined with cement mortar, have a dielectric coating, and have a cement-mortar coating (rock shield) on the exterior of the pipe. The type of dielectric coating would depend on the corrosivity of the soil and would be determined during final design. Ductile iron pipe, if used, would also be cement-mortar lined, with an asphaltic 1-mil-thick exterior coating, and a polyethylene encasement in areas of corrosive soil, also to be determined during final design.

The temporary right-of-way for pipeline construction would be 60 feet wide to allow for soil disturbance during pipeline trenching, laying, backfilling operations, and laying of the electrical lines to the wellfield. Staging areas during pipeline construction would consist of a 3-acre area at the northern end of the pipeline in Section 4; a 3-acre area midway along the pipeline just east of the Toquop Gap; and 3 acres at the power plant site. Because the acreage for the third area is included in the total for the power plant site, the water pipeline staging areas are considered to total 6 acres. After construction, a long-term 30-foot-wide right-of-way would be sufficient for maintenance activities. The construction and long-term rights-of-way for the 12.5-mile-long water pipeline would include approximately 90 acres and 45 acres, respectively. All disturbed lands within these rights-of-way and staging areas would be reclaimed. Maintenance would include periodic inspection of the entire route and routine exercising of all valves in the system. It is anticipated that this activity could be supported using low-impact all-terrain vehicles (ATVs). Should major maintenance or repair be required, most equipment could be supplied by helicopter or four-wheel drive vehicles to eliminate the need for a permanent access road. Vegetation would be reestablished in the disturbed surface areas over time according to measures described in *Section 2.2.5, Best Management Practices and Standard Operating Procedures.* Signs would be posted to discourage recreational use of this right-of-way and to warn of electrical hazards in the event of excavation.

2.2.4 Construction Activities

Figure 2-3 shows the proposed project schedule. The construction phase for the access road, power plant, and water pipeline would start in November 2002 as soon as the requisite project approvals, permits, and ROWs are obtained. Construction would last for approximately 26 months. The average construction crew is estimated to be approximately 500 people. Normal construction hours would be from 6 a.m. to 3 p.m. on weekdays; however, some activities would require extended operation hours for scheduling constraints, to maintain structural integrity of concrete pours, or for other time-sensitive matters.



Toquop Energy Project Schedule

Figure 2-3

Construction activities would include the following four phases:

- Site clearing and preparation
- Foundation construction
- Building and equipment installation
- Site cleanup and project start-up

2.2.4.1 Site Clearing and Preparation

Site clearing and preparation would require heavy, diesel-powered earthmoving equipment including bulldozers, scrapers, dump trucks, and front-end loaders. Site clearing and preparation would occur at all locations where equipment would be constructed or installed and along the access road to be widened. Some blasting is anticipated, depending on site-specific conditions at the various construction sites and the results of geotechnical field investigations during final design. The amount of cut and fill would be estimated during detailed final design, pending approval of the ROWs and acquisition of required permits. Table 2-1 presents an estimate of the number, type, and length of use of construction equipment.

The size of the area used for borrow material would depend on the suitability of available materials and be determined during final design. However, all borrow material would come from areas that would be disturbed during construction of the power plant and ponds. If additional borrow material is needed, it would come from an existing offsite commercial facility. No new borrow areas would be constructed for this project.

During construction, up to 125,000 gallons (0.4 acre-foot) of water would be used daily. This water would be acquired from the permanent ground water system for the project. Water uses during the construction phase would include dust control, concrete curing, and hydrostatic testing of completed pipelines and heat recovery steam generators. Only bottled water would be used for human consumption.

During construction, diesel-powered generators would produce the required electricity. Generators would be connected to an onsite transformer for distribution to electrically powered construction tools and equipment. Communications during construction would be accomplished via a microwave tower that would be constructed on the power plant site.

An estimated 449 acres would be disturbed and/or included in construction rights-of-way under the Proposed Action. This total would consist of 100 acres that would be fenced and enclose the power plant, switchyard, equalization and evaporation ponds, associated facilities, and a lay-down area; 216 acres of new disturbance for the access road; up to 15 acres for the wellfield; 1 acre for the monitoring well; 1 acre for the storage tank; 90 acres for the water pipeline; and 26 acres for staging areas (20 acres for the access road and 6 acres for the water pipeline). Disturbed lands within rights-of-way would be reclaimed as a component of the Proposed Action according to measures described in *Section 2.2.5, Best Management Practices and Standard Operating Procedures.* Long-term disturbances would total 182 acres and consist of 100 acres for the fenced power plant site; 17 acres for the wellfield, monitoring well, and storage tank; and 65 acres of net new disturbance for the access road. Other lands disturbed during construction along the access road, in the pipeline right-of-way, and at staging areas (267 acres), would be reclaimed.

TABLE 2-1
Time and Equipment Construction Requirements for the Proposed Action

Component	Equipment	Capacity (horsepower)	Fuel Type	Number of Units	Use Days (per unit)	Total Use (in days)
Power Plant (730 days)						
	Excavator/Trackhoe	250	Diesel	4	50	200
	D10 bulldozer	400	Diesel	1	175	175
	Front-end loader	200	Diesel	2	730	1,460
	Backhoe	200	Diesel	3	120	360
	Crane	225	Diesel	6	135	810
	Water truck	300	Diesel	2	250	500
	Concrete truck (20,000 cubic yards; 2,000 trips)	325	Diesel	12	80	960
	Dump truck	250	Diesel	3	80	240
	Material delivery truck (3,000 trips)	250	Diesel	—	—	1,500
	Concrete pump truck	400	Diesel	1	120	120
	Loader	100	Diesel	1	290	290
	Fork lift truck	100	Diesel	6	235	1,410
	Electric generator	5	Gasoline	10	200	2,000
	Pick-up truck	150	Gasoline	3	730	2,190
	Welder	250 amps	Electric	15	60	900
Access Road Construction (180 days)						
	D8 bulldozer	400	Diesel	2	120	240
	D6 bulldozer	300	Diesel	2	120	240
	Scraper	300	Diesel	4	120	480
	Water truck	250	Diesel	2	150	300
	Pick-up truck	200	Diesel	2	150	300
	Asphalt trucks	250	Diesel	6	60	360

TABLE 2-1
Time and Equipment Construction Requirements for the Proposed Action

Component	Equipment	Capacity (horsepower)	Fuel Type	Number of Units	Use Days (per unit)	Total Use (in days)
Water Pipeline Construction (90 days)						
	Trackhoe	300	Diesel	2	80	160
	D6 bulldozer	300	Diesel	2	80	160
	Pick-up truck	150	Diesel	2	90	180
	Pipe delivery truck	250	Diesel	1	80	80

2.2.4.2 Foundation Construction

Foundation construction would involve concrete handling equipment such as concrete trucks, mixers, vibrators, and pumps. Some earth-moving equipment also would be required to backfill the foundations. Any blasting activities that may be required would occur for as short a duration as possible and would be limited to daytime.

2.2.4.3 Building and Equipment Installation

Building and equipment installation would involve mobile cranes, equipment delivery, impact wrenches, grinders, and air compressors. Activities would be restricted to the power plant site, except for the water pipeline and the water storage tank to be constructed in the Tule Desert and the widening of the access road.

2.2.4.4 Site Cleanup and Facility Start-Up

Site cleanup and power plant start-up would generally require minimum amounts of heavy machinery. It would primarily include flushing pipes, blowing out steam lines, and testing equipment and controls. The facility would begin commercial operation in January 2005 (see Figure 2-3).

2.2.5 Best Management Practices and Standard Operating Procedures

Activities under the Proposed Action would consist of two sets of actions that are a specifically directed and an integral part of the Proposed Action. The first set of actions would be to comply with the terms and conditions of all ROWs issued by the BLM. The second set of actions would be to follow best management practices (BMPs) and standard operating procedures (SOPs) typically associated with the construction, operation, and maintenance of power plants, wellfields, pipelines, other utility corridors, and related facilities in this region of the western United States. These BMPs and SOPs would be followed to avoid or minimize the potential for adverse environmental effects resulting from project-related activities. Special emphasis would be placed on protecting desert tortoise and their habitat. *Appendix A* lists management prescriptions for desert tortoise habitat that are consistent with the

Desert Tortoise Recovery Plan, relevant HCPs, and other identified management documents, and which would be followed during project construction, operation, and maintenance activities. *Appendix B, Standard Construction and Operation Procedures*, describes BMPs and SOPs for the following activities:

- Landscape preservation and impact avoidance
- Erosion and sediment control
- Pipeline and utility corridor construction
- Biological resources
- Cultural resources
- Site restoration and revegetation
- Visual resources
- Water pollution prevention and monitoring
- Transportation
- Noise and air pollution prevention
- Hazardous material storage, handling, and disposal, and safety measures

Appendix C, Cultural Resources Programmatic Agreement, contains the Cultural Resources Programmatic Agreement with stipulations to ensure that historic and prehistoric properties will be treated to avoid or mitigate project-related effects to the extent practical and to satisfy BLM Section 106 responsibilities. Mitigation measures specific to various resources present in the project area are referenced in *Chapter 4, Environmental Consequences*.

2.2.6 Decommissioning

The proposed power plant would have a life expectancy of 42 years, including construction. At the end of its useful life, the power plant would be decommissioned. At decommissioning, all structures and equipment at the site would be dismantled and removed. The onsite evaporation and equalization ponds would be excavated to remove sediment. The excavated material would be tested and disposed of at an approved offsite disposal facility. All pond liners would be removed and the land surface would be regraded. The water pipeline and electric distribution line would be closed and left in place. All wells would be decommissioned and abandoned in accordance with state regulations. Use of the water rights by Vidler Water Company and Lincoln County after the 42-year project life is unknown.

2.3 Alternative 1

2.3.1 Description of BLM Actions

BLM actions that would occur under Alternative 1 would be the same as those described for the Proposed Action (see *Section 2.2.1, Description of BLM Actions*), with one exception. The ROW issued by the BLM for the construction and operation of a water pipeline and buried electric distribution power lines under Alternative 1 would be for an eastern rather than a western alignment. This alternative alignment is depicted in Map 2-2 and described below in *Section 2.3.3.1, Water Pipeline*. Otherwise, BLM actions under Alternative 1 would include amending the Caliente MFP, completing the proposed Pah Rah/Toquop land exchange, and issuing the same ROWs described for the

Proposed Action that are necessary for the construction and operation of the Toquop Energy Project.

2.3.2 Description of Project Area, Land Exchange, and Power Plant Site

Map 2-2 depicts the project area as well as locations of prominent project features, including the land exchange parcel and the power plant site associated with Alternative 1. These are all the same as were described for the Proposed Action (see *Section 2.2.2, Description of Project Area, Land Exchange, and Power Plant Site*), except for the water pipeline and buried electric distribution power lines, which would follow a more easterly alignment under Alternative 1 than under the Proposed Action. Otherwise, the same parcels of land would be exchanged according to conditions of the Pah Rah/Toquop land exchange, and the power plant site would be located on the exchanged parcel in Section 36, T11S, R69E in Lincoln County (see Map 2-4).

2.3.3 Description of Project Features and Operation

Project features, their operation, and associated actions under Alternative 1 would be the same as those described for the Proposed Action (see *Section 2.2.3, Description of Project Features and Operation*), except for the water pipeline and buried electric distribution power lines, which are described in the following text. Otherwise, the power plant and associated facilities, road access and transportation between I-15 and the power plant site, and the ground water wellfield would be the same as described for the Proposed Action.

2.3.3.1 Water Pipeline

The water pipeline would follow a more easterly alignment under Alternative 1 than under the Proposed Action. This eastern alignment would follow the existing road that extends south-southeast from the Tule Desert to the Toquop Wash plant site, with one exception. On its southern end, the pipeline would depart from the road and follow along the west side of a range line south for about 3 miles in order to avoid the FWS-designated desert tortoise critical habitat, which is on the east side of the rangeline in this area (see Map 2-2 and desert tortoise discussions in *Section 3.1, Threatened, Endangered, and Sensitive Species*). The ground water well pumps would pump directly to a raw water storage tank located on an intermediate high point several miles southeast of the wellfield. The aboveground storage tank (configuration and color to be determined during final design to blend with background conditions) would then feed the water by gravity to the power plant. The storage tank would have a capacity of approximately 500,000 gallons and disturb no more than 1 acre of land. Electric distribution power lines from the power plant to the well pumps would be buried adjacent to the water pipeline.

The total length of this water pipeline would be 12.6 miles, or 0.1 mile longer than the more westerly route described for the Proposed Action. Its construction ROW (60 feet wide and 92 acres) and long-term right-of-way (30 feet wide and 46 acres) would be nearly identical in size to the western alignment under the Proposed Action. It would also have three 3-acre staging areas for construction: one near the north end; one near the mid-point of the pipeline; and one in the power plant site. Because the acreage for the third site is included in the total for the power plant site, water pipeline staging areas are considered to total 6 acres. All disturbed lands within these rights-of-way and staging areas would be reclaimed. Approximately 85 percent of the pipeline would run next to the existing road. This would provide easier, quicker access than the western alignment for larger vehicles should major maintenance or repair be necessary. In addition to being slightly longer, this alternative pipeline route would cross the main stem of the Toquop Wash at one of its deepest points (140 feet).

2.3.4 Construction Activities

Construction activities associated with site clearing and preparation, foundation construction, building and equipment installation, and site cleanup and facility start-up would be the same as those described for the Proposed Action (*see Section 2.2.4, Construction Activities*). Because of their nearly identical lengths, time and equipment requirements for constructing the eastern pipeline alignment under Alternative 1 would be the same as presented in Table 2-1 for the western pipeline alignment under the Proposed Action. Acres of lands disturbed and/or included in construction ROWs would be nearly identical to the Proposed Action, totaling approximately 451 acres. Long-term disturbances would total 182 acres, the same as for the Proposed Action, with 269 acres being reclaimed.

2.3.5 Best Management Practices and Standard Operating Procedures

Activities that are a specifically directed and an integral part of Alternative 1 would be the same as those described for the Proposed Action (see *Section 2.2.5, Best Management Practices and Standard Operating Procedures*). They would consist of: complying with the terms and conditions of all ROWs issued by the BLM; the protection of desert tortoise habitat as described in *Appendix A*; following BMPs and SOPs listed in *Appendix B* that are associated with project construction, operation, and maintenance activities; and complying with stipulations of the *Cultural Resources Programmatic Agreement* contained in *Appendix C*.

2.3.6 Decommissioning

Decommissioning of the power plant site under Alternative 1 would be the same as described for the Proposed Action (see *Section 2.2.6, Decommissioning*).

2.4 Alternative 2

2.4.1 Description of BLM Actions

The same kinds of BLM actions would occur under Alternative 2 as under the Proposed Action. However, they would differ in specifics because of differences in the parcels of land to be exchanged, location of the power plant site, and the nature and extent of the utility corridor and access road (see Map 2-3). The BLM would amend the Caliente MFP in order to identify lands as being suitable for disposal (exchange) under Alternative 2. The resultant land exchange would trade the privately owned Pah Rah parcel of land in Washoe County for a similarly valued parcel of public land in the Tule Desert in Lincoln County that is presently being managed by the BLM. The Tule Desert parcel would then be acquired by Toquop Energy from NLRC and serve as the power plant site under Alternative 2. In addition to ROWs described for the Proposed Action, the BLM would issue ROWs for the construction and operation of an extended access road, a buried natural gas pipeline, and an overhead electric transmission line corridor that would be necessary for this northern power plant site.

2.4.2 Description of Project Area, Land Exchange, and Power Plant Site

Map 2-3 depicts the project area and locations of prominent features, including the land exchange parcel and the power plant site, associated with Alternative 2. The overall project area for this alternative is the same as for the Proposed Action, although the locations of many of the project features would differ. Under Alternative 2, the power plant site shown on Map 2-5 would be located on the exchanged Tule Desert parcel in Section 4, T10S, R69E, approximately 12 miles north-northwest of the Toquop Wash site.

2.4.3 Description of Project Features and Operation

The features, operation, and associated actions for the power plant and wellfield would be the same for Alternative 2 as for the Proposed Action (see *Section 2.2.3, Description of Project Features and Operation*). However, under Alternative 2, the power plant would be located adjacent to the wellfield in the Tule Desert. This would eliminate the need for constructing a long water pipeline, but would add the need for an electric transmission line and gas pipeline of 12.0 miles each. This location also is the site of one recently drilled potential production well. The well was drilled to gather data concerning the yields available from the ground water resources in this area, which would provide information necessary for the final design of the wellfield. Differences in the utility corridor and access road compared to the Proposed Action are described in the following text.

2.4.3.1 Utility Corridor

Locating the power plant in the Tule Desert under Alternative 2 would require the construction of 12.0 miles of buried natural gas pipeline to bring fuel to the site, and 12.0 miles of an overhead electric transmission interconnection to carry net power production to the Navajo-McCullough Electric Transmission Line. It is anticipated that the gas pipeline would be 20 inches in diameter and the transmission interconnection would be a 500-kV overhead line, similar to the receiving transmission line. Both lines would be placed in a 120-foot-wide right-of-way adjacent to an existing road. Because of its width, construction staging areas would be located within the right-of-way. This 12.0-mile-long right-of-way would contain 175 acres. All disturbed lands in the corridor would be reclaimed except for that portion of the improved access road (discussed in *Section 2.4.3.2, Road Access and Transportation*) that would be located within the utility corridor.

Except at their southern ends, these two utility interconnection lines would follow the eastern water pipeline alignment described for Alternative 1 (see Maps 2-2 and 2-3 for alignment comparison). Neither the gas pipeline nor the electric line would cross the Toquop Wash, but would cross the range line into the FWS-designated desert tortoise critical habitat area. The utility lines would originate in Section 30, T11S, R70E, just east of the wash where the Kern River Gas Pipeline and the Navajo-McCullough Electric Transmission Line are in proximity. Starting the utility corridor at this point prevents 0.2 mile of habitat disturbance and completely avoids the difficult crossing of the Toquop Wash.

2.4.3.2 Road Access and Transportation

Constructing an additional 12.2 miles of access road would be required to reach the plant site under Alternative 2. This access road would continue from its proposed terminus described for the Toquop Wash power plant site under the Proposed Action, cross the Toquop Wash, proceed north through desert tortoise critical habitat (but outside an ACEC) for approximately 4.3 miles to the range line, then continue along the existing dirt road alignment to the Tule Desert plant site. This alignment would involve extensive grading, sub-base preparation, straightening, and paving of this primitive road, except where the road crosses the Toquop Wash. At this location, the road would only be smoothed and flattened slightly to facilitate the passage of larger construction equipment. In the event of intermittent flooding, access across the Toquop Wash would be delayed until flood waters subside or, alternatively, the power plant site would be accessed via the Carp-Elgin Road.

The construction right-of-way for the 14.4 miles of upgraded access road from I-15 to the Toquop Wash site would disturb an additional 216 acres of habitat, plus require 20 acres for staging areas, the same as for the Proposed Action. After reclamation the net new disturbance for this 14.4-mile segment would be 65 acres. In addition, the southernmost 4.3 miles of the 12.2-mile road extension would lie in a separate construction right-of-way that includes approximately 53 acres. The net new disturbance following reclamation would be approximately 19 acres in the 4.3-mile segment. The remaining 7.9 miles of road would lie within the 120-foot-wide utility corridor right-of-way with the natural gas and electric lines. The net new disturbance from the 7.9-mile-long road segment would be approximately 36 acres. Any additional staging areas for the 12.2-mile road extension would be located within the 120-foot-wide utility corridor right-of-way and reclaimed following construction.

2.4.4 Construction Activities

The general types of construction activities associated with site clearing and preparation, foundation construction, building and equipment installation, and site cleanup and facility start-up would be the same as those described for the Proposed Action (see *Section 2.2.4, Construction Activities*). However, because of the proposed power plant location under Alternative 2, approximately twice the effort would be required to construct the access road compared to the Proposed Action (see Table 2-1). In addition, extending the natural gas pipeline and the electric transmission line under Alternative 2 would require substantially more effort than constructing the water pipeline under the Proposed Action.

An estimated 581 acres would be disturbed and/or included in construction rights-of-way for Alternative 2. This total would consist of 100 acres that would be fenced and enclose the power plant, switchyard, equalization and evaporation ponds, associated facilities, and a lay-down area; up to 15 acres for the wellfield; 1 acre for the monitoring well; 1 acre for

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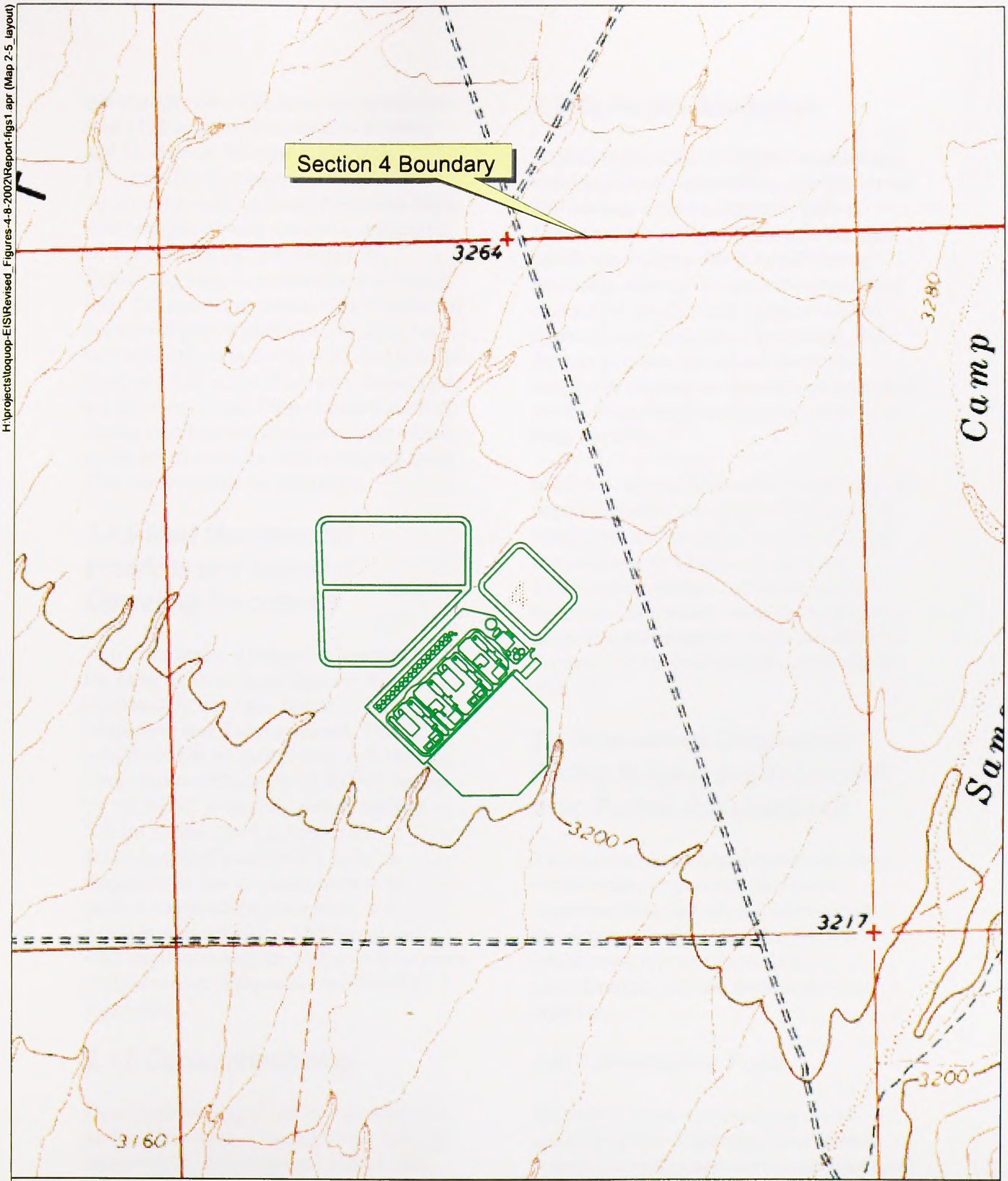


Toquop Energy Project Proposed Plant Site
Alternative 2
(Section 4)

Source:
Maptech 1:24,000 Scanned Topo
Maps

Map 2-5

CH2MHILL

the storage tank; 269 acres for the access road (216 acres in the initial 14.4 miles and 53 acres in the next 4.3 miles); 175 acres for the utility corridor; and 20 acres for staging areas. Disturbed lands within rights-of-way would be reclaimed, as described in the preceding text. Remaining long-term disturbances would total 237 acres and consist of 100 acres for the fenced power plant site; 17 acres for the wellfield, monitoring well, and storage tank; and 120 acres of net new disturbance for the access road. Other lands disturbed during construction along the access road, in the utility corridor, and at staging areas (344 acres) would be reclaimed.

2.4.5 Best Management Practices and Standard Operating Procedures

Activities under Alternative 2 would be the same as those described for the Proposed Action (see *Section 2.2.5, Mitigation and Enhancement*). They would consist of: complying with the terms and conditions of all ROWs issued by the BLM; protecting desert tortoise habitat as described in Appendix A; following BMPs and SOPs listed in Appendix B that are associated with project construction, operation, and maintenance activities; and complying with stipulations of the *Cultural Resources Programmatic Agreement* contained in Appendix C.

2.4.6 Decommissioning

Decommissioning of the power plant site under Alternative 2 would be the same as described for the Proposed Action (see *Section 2.2.6, Decommissioning*).

2.5 No Action Alternative

Section 1502.14(d) of NEPA regulations requires that the alternatives analysis in an EIS include a No Action Alternative. Under the No Action Alternative for this DEIS, the Caliente MFP would not be amended, none of the project-related land exchanges would occur, project-related rights-of-way would not be created, and the power plant and related facilities would not be built or operated as described for the Proposed Action, Alternative 1, or Alternative 2.

If the No Action Alternative is selected for implementation, existing conditions and trends that are described for the affected environment in *Chapter 3, Affected Environment*, of this document would continue. As a result, none of the project purposes and needs that were described in *Section 1.2, Purpose and Need*, would be met.

2.6 Alternatives Considered During Scoping but Eliminated from Further Consideration

This section describes alternatives, their components, or possible ancillary improvements that were considered in developing the Proposed Action, but which were rejected from further consideration, and the reasons for their rejection.

2.6.1 Alternative Fuels

Alternative fuels to natural gas were considered but eliminated from further consideration because they would not meet an important component of project purpose and need—the need to generate electrical power at competitive costs for use by consumers to ease forecasted power shortages in the western United States. Using alternative fuels (such as coal, fuel oil, biomass, or solar) would not be as cost-effective or efficient as using natural gas for the Toquop Energy Project. In addition, using some of these alternative fuels could potentially result in issues or effects that would make them less environmentally attractive than using natural gas.

The power plant sites for the Proposed Action and Alternative 1, and to a lesser extent for Alternative 2, are well-suited for the delivery of natural gas via the Kern River Gas Pipeline. Using natural gas also presents some air quality and visibility benefits compared to using fuels such as coal, biomass, and fuel oil. Coal, biomass, and fuel oil would have to be transported to either of the proposed power plant sites by rail or truck. This raises issues related to additional transportation costs, the accessibility of rail lines for transport, and road use and public safety concerns associated with truck transport. Further, there are risks from potential spills of fuel oil during its transport and storage, while the onsite handling and storage of coal would result in fugitive dust emissions and increased noise levels. In addition, the coal gasification technology for use in combustion turbine generators has not been fully developed. Other issues associated with this technology include the generation of solid wastes, hazardous material storage and handling, and additional water needs.

Various solar power technologies that use a system of photovoltaic cells or that concentrate solar energy power through the use of parabolic troughs, collector dishes, or tracking mirrors were considered. None of these solar power alternatives were found to be practical or feasible to cost-effectively and efficiently meet the project purposes and needs. Their limitations include extremely large land requirements, high cost of generating power, and/or some technologies are not yet commercially available.

2.6.2 Alternative Locations

Alternative project locations were considered but eliminated from further consideration because they would not meet the project purposes and needs described in Chapter 1 of this DEIS. The project area shown in Map 1-1 was selected because it presents the greatest benefits to all parties involved, including: benefits to Toquop Energy and consumers through the cost-effective generation and sale of electric power to help meet local and regional shortages; to the BLM through their acquisition of a desirable parcel of land that is presently in private ownership; and to Lincoln County through increased economic benefits associated with project development. Alternative project locations presented unacceptable environmental impacts (proximity to Class I areas and ACECs); greater impairment of visual, biological, and ground water resources; difficulty and additional costs for fuel delivery and transmission line access; and lack of economic benefits to communities within and near Lincoln County.

2.6.3 Alternative Access Road

An existing access road is available from I-15 to the proposed power plant site. Alternatives to upgrading that road would require a new road through the Mormon Mesa ACEC and designated critical desert tortoise habitat or upgrading a considerably longer existing road that would impact desert bighorn sheep habitat. These significant policy and environmental constraints make alternative access roads infeasible and were therefore rejected from further analysis.

2.6.4 Alternative Cooling Systems

Available alternative cooling systems were considered but were not selected because they would not meet some essential components of the project purpose and need. All available alternatives to the proposed cooling system would present economic disadvantages, lower performance and efficiency, higher capital and operational costs, increased fuel consumption, and increased air emissions.

Combined cycle power plants, the proposed technology, produce electricity through two sequential processes. In the first process, electricity is produced by burning natural gas in a combustion turbine generator. In the next process, exhaust heat from the combustion turbine is passed through a heat recovery steam generator to generate steam which is used to power a steam turbine generator. Exhaust steam from the steam turbine is then condensed to water and returned to the heat recovery steam generator to complete the cycle. In the proposed Toquop facility, up to 43 percent of the total facility output is produced by the steam cycle process. As such, the type of cooling system used to condense steam in this process has a major impact on the efficiency and economics of a facility.

Steam electric power generation follows the thermodynamic process known as the Rankine Cycle. In this process, water is heated to high-temperature, high-pressure steam, which is used to power the steam turbine generator. After powering the steam turbine, the steam is condensed back into water, whereupon the cycle is repeated. The steam is condensed using heat exchangers, or condensers, where the remaining steam energy is transferred to a cooling media such as water or air.

Power generated by a steam turbine is a function of turbine exhaust pressure (back pressure). A higher back pressure will result in less efficient operation and lower power production. Steam turbine back pressure is determined by the rate at which exhaust steam is condensed to water; if steam is condensed to cooler water the back pressure will be lower and the steam turbine efficiency and power production will be higher. The rate at which steam is condensed in a condenser is determined by the temperature and thermal properties of condenser cooling media. Thus, the overall efficiency and power output of the steam generating cycle is a function of condenser design.

The following three general types of condenser cooling systems are available for combined cycle power plants:

- Once-through cooling systems
- Evaporative cooling systems
- Radiant cooling systems

In both once-through and evaporative cooling systems, the condenser consists of a shell-and-tube heat exchanger which uses water as the cooling media. Steam passes through the shell side of the heat exchanger around tubes through which flow the cooling water. Heat from the condensing steam is conducted through the metal tubes and is transferred to the cooling water. The cooling water is then discharged back to a large body of water in the case of a once-through cooling system, or is recycled through a cooling tower in the case of an evaporative cooling system. Evaporative cooling systems can be further categorized into those utilizing natural draft or forced draft cooling towers.

A radiant cooling system uses air as the cooling media. In an air-cooled-condenser, the heat from the condensing steam is transferred through tubes to ambient air instead of to cooling water.

The Proposed Action would use an evaporative cooling system with water as the cooling media passing through a forced draft cooling tower. Rationale for elimination of the other alternative condenser cooling systems is presented below.

2.6.4.1 Once-Through Cooling Systems. Once-through cooling systems require an essentially infinite source of cooling water (for example, an ocean, large lake or river). During once-through cooling, the water makes a single pass through the steam condenser, absorbs heat from the steam, then is released back into its source. While once-through cooling systems do not consume water through evaporation, the source/receiving water body is subject to impacts associated with the thermal discharge. The cooling system is subject to impingement and entrainment of aquatic organisms which can jeopardize operation of the condenser.

The Proposed Action is not near a large source of cooling water; therefore a once-through cooling system is not technically feasible.

2.6.4.2 Alternative Evaporative Cooling Systems. In an evaporative cooling system, the cooling water directed to the condenser is heated by the condensing steam. The heated water is then circulated through a cooling tower where a portion of the cooling water is evaporated. Because energy is required to change liquid water to water vapor, the evaporation draws heat from and cools the unevaporated portion of the cooling water. The remaining, cooled water is recirculated back to the condenser and the cooling water cycle is repeated. A fresh water supply is required to replenish the water lost through evaporation.

The cooling tower functions as an evaporative cooler by intermingling the heated water returning from the condenser with the ambient air. Through this process, heat absorbed by the cooling water is released to the atmosphere. The majority of the heat transfer from the water to the air (greater than 75 percent) is through evaporation of a portion of the water. The remaining heat loss is through direct heating of the inlet air by the heated water.

The cooling ability of an evaporative cooling system is a function of how close it can bring the cooling water temperature leaving the cooling tower to the wet bulb temperature of the surrounding air. Facilities located in regions with lower air temperature and lower humidity (indicating lower wet bulb temperature), can absorb more water and produce a cooler outlet cooling water temperature than those located in humid areas.

Through evaporation of a portion of the cooling water, the remaining water can be cooled to within 10°F of the wet bulb temperature of the ambient air. Because of the dry climate in the area of the proposed Toquop facility, and despite the high ambient temperatures, the ambient air wet bulb temperatures are typically low. With these low wet bulb temperatures, the cooling water temperature of an evaporative cooling system will stay uniformly low as will the backpressure on the steam turbine. Therefore, use of an evaporative cooling system will allow the steam turbine generator to operate at its maximum rated efficiency at most times.

Two types of cooling towers are used with evaporative cooling systems; forced draft, also referred to as mechanical draft cooling towers and natural draft cooling towers. In the proposed forced draft cooling tower, the heated water returning from the condenser cascades over a packing material in the tower. The packing is engineered to break the water flow into many small rivulets of water. Large electric fans, located on top of the tower, pull ambient air upwards through the packing. The resulting mixing of air and water maximizes the evaporative efficiency of the cooling tower.

A natural draft cooling tower is an alternative to the proposed forced draft system. In a natural draft tower, the higher density of the cooler air outside of the tower and the lower density of the warmer air inside of the tower creates a pressure gradient which results in an air flow from the outside bottom of the tower out the top of the tower without the use of fans. A natural draft cooling tower is taller and has a larger footprint than a forced draft tower. It is typically of hyperbolic design and has a much higher capital cost than a forced draft cooling tower The primary advantage of a natural draft tower is that the power otherwise required for fans is not required. For some plants, cost savings can be achieved with a natural draft system. The natural draft system, however, would create no savings in water evaporation and thus no savings in raw water consumption in comparison to a forced draft system. Because the Proposed Action is located in a hot dry climate where natural draft towers do not typically work well and would not result in a reduction in raw water consumption, natural draft towers were eliminated from consideration.

2.6.4.3 Radiant Cooling Systems

With an air-cooled condenser, steam flows from the steam turbine into a series of heat exchanger tubes. Heat is transferred through the tube walls directly to the ambient air by radiation and convection. Fins are typically used on the outside of the tubes to increase the heat transfer surface area. The condensed steam (now water) is recirculated back to the heat recovery steam generator where it is reheated to steam and sent to the steam turbine.

An air-cooled condenser transfers the steam heat directly to the atmosphere. For a given condenser, the maximum possible heat transfer, and thus the maximum amount of steam that can be condensed, is directly related to the ambient air temperature. When the ambient air dry bulb temperature is less than 65°F, the heat transfer efficiency of an air-cooled condenser is approximately equal to that of a water-cooled condenser. As the dry bulb temperature rises above 65°F, the heat transfer efficiency of the air-cooled condenser rapidly decreases. As the heat transfer rate decreases, the efficiency of the steam turbine generator also decreases, and the amount of electricity generated from a given amount of fuel is reduced. In general, air-cooled condenser systems are best suited for use in cooler regions where water consumption is a concern.

A variation of the air-cooled system is referred to as a parallel cooling system, which utilize both water cooled and air-cooled condensing technology. In a parallel cooling system, steam is preferentially routed to the air-cooled portion of the overall system. The water cooled portion is used when the air-cooled portion can not effectively cool the in coming steam to an acceptable level. Capital cost for this type of cooling system is much higher than for either a water cooled system or an air-cooled system. Since a portion of the heat load from the condensing steam would be dissipated by evaporating water, and a portion would be dissipated through heat transfer to the ambient air; a parallel system would provide for a partial savings in raw water consumption. However, because a portion of the cooling would be accomplished using air as the cooling media, there would be an adverse impact on the efficiency of the overall power plant. As with the full air-cooled option, this technology is generally best suited for use in cooler climates.

Air-cooled condensers and parallel cooling systems were evaluated but eliminated from consideration for the following reasons:

- The use of an air-cooled system in a hot climate such as the proposed project site would result in decreased plant efficiency, increased air emissions and increased use of natural gas per unit of energy produced.
- The use of an air-cooled system would result in increased capital and operations costs and make the project unable to fulfill the requirement set out in the Purpose and Need that the proposed action generate power at competitive rates to the consumer.
- The increased capital and operation cost associated with the air-cooled option would result in making the project non-competitive in the regional wholesale electric marketplace, thus making the project economically unfeasible.
- The use of an air-cooled system would result in the loss of fiscal benefits to Lincoln County.

2.6.4.3.1 Decreased Plant Efficiency, Increased Air Emissions and Increased Use of Natural Gas. The ambient temperature in the general area near the site of the Proposed Action is at or above 65°F approximately 57 percent of the time, with an average summer temperature of 84°F. Ambient temperatures of up to 118°F have been recorded near the site. Significant impacts on plant efficiency resulting from the use of the air-cooled alternative would be experienced at these temperatures.

To compensate for the reduced efficiency associated with the air-cooled alternative, the facility duct burner sizing would be increased to allow the facility to produce the same power output as under the proposed action. Under this scenario, the facility duct burners would have to be fired at approximately 379 million BTU per hour (MMBTU/hr) each in order to achieve the same power output as a water cooled plant fired with duct burners at 241 MMBTU/hr each. The duct burners would also have to be fired more often; the duct burners for the air-cooled system would be fired approximately 4,360 hours per year to match the plant output of a water cooled facility with 3,000 hours per year of duct burner firing.

2.6.4.3.2. Increased Capital and Operations Costs. The air-cooled alternative would result in an increase in the capital and operational cost of the proposed project as shown in the analysis below. As discussed above, the decrease in operational efficiency and increased parasitic load of this alternative associated with the use of large electric fans would require the consumption of additional natural gas, directly resulting in higher energy costs to the consumer. Because the majority of modern power plants are wet-cooled, it would be more difficult to satisfy the stated purpose and need that the power plant generate power at competitive rates to the consumer.

Air-cooled systems cost more to construct than water-cooled evaporative systems. Based on the design capacity of the proposed project, the air-cooled option would add approximately $12.2 million capital costs and at least $3.0 million annual operations and maintenance costs to the facility. This would result in an increased net present value (NPV) cost of $44.5 million over a 40-year plant life. This additional cost results primarily from higher equipment cost for the air-cooled condenser and decreased plant efficiency plus increased parasitic power loads, which require increased fuel consumption.

2.6.4.3.3 Effect of Increased Capital and Operation Cost on the Investment Viability of the Project.

Toquop Energy has selected a water-cooled mechanical-draft cooling tower as the best available alternative for the project's heat rejection system. This water-cooled system will meet Toquop Energy's objectives of developing a financially viable project to benefit Lincoln County while minimizing power costs to regional consumers and the environmental impact of facility operation.

The air-cooled alternative would result in a generating facility design burdened with significantly higher capital costs and operating expenses. These higher costs and expenses would most likely result in a project that was not financially viable and could not, therefore, be constructed and operated.

Potential lenders to the Toquop project require that financial projections demonstrate that, after payment of all operating expenses, maintenance reserves, and taxes, the project has an available cash flow that exceeds required debt repayment by a certain percentage. The ratio of available cash flow to required debt repayment is called "debt coverage ratio" and is one of the most important considerations in determining the financial viability of a project. To obtain financing, Toquop Energy must demonstrate, using conservative assumptions, that the lender's required debt coverage ratios will be met during each year of projected operation.

Debt coverage ratios can be increased by reducing costs, increasing revenues, or by replacing some project debt with equity. Because Toquop Energy must meet regional electric market pricing, the significantly higher costs associated with the air-cooled alternative could only be mitigated by increasing the amount of project equity investment relative to debt.

Project lenders allow cash distribution to equity investors only after payment of all other expenses including operating expenses, maintenance reserves, taxes, and debt. These distributions, typically made quarterly, provide investors with recovery of, and return on, their equity investment.

To obtain equity investment, Toquop Energy must conservatively demonstrate that equity will be recovered and that the equity return will at least meet the investor's cost of capital.

The significantly higher capital costs and operating expenses associated with the air-cooled alternative make it unlikely that the required debt coverage ratios and equity cost of capital could be satisfied at expected regional electric market pricing. Toquop Energy has, therefore, selected an evaporative cooling system.

2.6.4.3.4 Loss of Fiscal Benefit to Lincoln County. The air-cooled alternative would have an adverse impact on the potential financial benefits to Lincoln County. With a water-cooled plant, water related revenue to Lincoln County should be approximately $9 million. This option provides the County a mechanism to directly benefit from the use of locally available water resources. Water revenue to Lincoln County for an air-cooled alternative would be very limited. In addition to the water related revenue, the proposed project is anticipated to provide tax benefits to the County as well. As noted above, the air-cooled alternative could result in the cancellation of the planned investment in the proposed project, thus eliminating all water related and tax fiscal benefits to the County.

2.7 Preferred Alternative

BLM's Preferred Alternative is the Proposed Action.

Chapter 3
Affected Environment

Chapter 3.0 Affected Environment

3.1 Introduction

This chapter describes the affected environment associated with the Proposed Action and alternatives for the Toquop Land Disposal amendment to the Caliente MFP and the Toquop Energy Project. The affected environment discussions describe existing conditions for those resources comprising the physical, biological, cultural, and human and socioeconomic environments within the project area. Maps 2-1, 2-2, and 2-3 in Chapter 2 depict the project area for the Proposed Action, Alternative 1, and Alternative 2, respectively. These project areas include the Toquop and Pah Rah land parcels and adjacent lands in the Toquop area for which the BLM would process a land exchange and/or issue ROWs for the construction, operation, and maintenance of the proposed project. The Toquop and Pah Rah areas, as well as the project areas and project features for the Proposed Action, Alternative 1, and Alternative 2, are described in detail in *Chapter 2, Sections 2.1 through 2.4*.

3.2 Soils and Geology

3.2.1 Soils

This section describes the soils of the three land parcels being evaluated, the alternative water pipeline alignments, the natural gas pipeline and transmission line alignment, the wellfield, and the access roads to the two alternative power plant sites. The U.S. Natural Resources Conservation Service (NRCS) (1965, 1979, 1990) provides more detailed information on soils.

3.2.1.1 Toquop Area

3.2.1.1.1 Proposed Action. The Proposed Action power plant site and water pipeline corridor (southern Toquop parcel, western water pipeline alignment) cover four soil associations: the Aymate-Canutio, Mormon Mesa, St. Thomas-Zeheme-Rock Outcrop, and the Zeheme Rock Outcrop associations (NRCS, 1990). The proportion of the four associations varies according to project area location. The Aymate-Canutio association consists of well-drained soils ranging from very gravelly loamy sand to gravelly sandy loam with a slight slope of 2 to 4 percent. The soils are highly susceptible to wind erosion and moderately susceptible to water erosion, factors that may have a bearing on reclamation potential. The Mormon Mesa association consists of well-drained soils ranging from fine sandy loam to gravelly fine sandy loam, primarily with a very slight slope of zero to 2 percent. The soils are highly susceptible to wind erosion and slightly susceptible to water erosion. The St. Thomas-Zeheme-Rock outcrop association consists of predominantly well-drained soils ranging from very gravelly sandy loam to very gravelly fine sandy loam, and some unweathered bedrock. Slopes are steep, varying from 20 to 50 percent. The loams are generally moderately susceptible to both wind and water erosion. The Zeheme-Rock outcrop association consists of extremely stony fine sandy loam (well-drained) and unweathered bedrock with steep slopes from 30 to 50 percent. The loam is slightly susceptible to both wind erosion and water erosion.

The access road would cross four soil map units. These are: the Mormon Mesa fine sandy loam with zero to 8 percent slopes; the Flattop gravelly clay loam with 2 to 8 percent slopes; the Rock Land-St. Thomas cobbly loam association with slopes from 15 to 60 percent; and the Badland unit of stratified sand, silt, and clay with slopes from 15 to 50 percent. These units are generally well-drained, except for the Badland where runoff is very rapid, and the wind and water erosion potential varies from slight to very high.

A mosaic of 25 soil associations are distributed across the proposed wellfield in the Tule Desert. The soils are predominantly gravelly sandy loam to very gravelly sandy loam in texture, with some cobble-dominated soils and very fine to fine sandy loam soils. Slope varies from zero to 75 percent with many of the associations falling within the zero to 15 percent or 30 to 50 percent ranges. All associations are well-drained, with the exception of associations having the Arizo soil series which is excessively drained. The majority of the associations are only slightly wind erodible, with a few being very slightly erodible to not erodible by wind. The Geta soil series in the Geta-Arizo association is extremely wind erodible. The majority of the soil associations in the proposed wellfield area are not highly susceptible to water erosion.

Biological soil crusts are present at the proposed power plant site and along the proposed water pipeline corridor. No biological soil crusts appear to be located in the wellfield. These soil crusts serve to reduce the rate of water and wind erosion that could occur in their absence.

3.2.1.1.2 Alternative 1. The power plant site and water pipeline corridor for Alternative 1 (southern Toquop parcel, eastern water pipeline alignment) occur on four soil associations. Three of these are the same as described for the Proposed Action: the Aymate-Canutio, Mormon Mesa, and St. Thomas-Zeheme-Rock outcrop associations. The fourth association, the Bracken gravelly fine sandy loam with 2 to 8 percent slopes, is considered to be somewhat excessively drained. This association is highly susceptible to wind erosion and moderately susceptible to water erosion.

The access road would cross the same soil map units described for the Proposed Action. Biological soil crusts are present along the proposed water pipeline corridor and the proposed power plant site.

3.2.1.1.3 Alternative 2. The power plant site and utility corridor for Alternative 2 (northern Toquop parcel, eastern gas pipeline/transmission line alignment) occur on the same four soil associations as Alternative 1. These are the Aymate-Canutio, Mormon Mesa, and St. Thomas-Zeheme-Rock outcrop associations, and the Bracken gravelly fine sandy loam with 2 to 8 percent slopes (NRCS, 1990).

The access road would cross the same soil map units described for the Proposed Action south of the southern Toquop parcel and the same soil map units described for the pipeline/transmission line utility corridor north of the southern Toquop parcel. Biological soil crusts are present along the utility corridor and may also occur at the northern power plant site.

3.2.1.2 Pah Rah Parcel

The Pah Rah exchange parcel consists of the Oppio-Rezave-Rock outcrop association, the Osobb-Rezave-Fireball association, and the Bombadil-Hefed-Rubble land association (NRCS, 1979).

The Oppio-Rezave-Rock outcrop association is the primary soil association on the Pah Rah parcel. It consists of extremely stony very fine sandy loam and rock outcrop. It is well-drained and occurs on slopes up to 15 percent. The hazard of wind erosion is slight. The Osobb-Rezave-Fireball association is found on the southern portion of the Pah Rah parcel. It consists of extremely stony fine to very fine sandy loam, with slopes up to 50 percent. The hazard of water erosion is slight to high, and the hazard of wind erosion is slight. The Bombadil-Hefed-Rubble land association is found on the northern portion of the Pah Rah parcel. It consists primarily of very stony sandy loam with slopes between 10 and 70 percent. The hazard of water erosion is high, and the hazard of wind erosion is slight.

3.2.2 Geology

3.2.2.1 Toquop Area

This section provides context for the subsequent evaluation of potential project-induced environmental consequences to the local geologic resources in the project area. Geologic features and issues related to seismicity are also discussed in this section. Additional geologic-related information is presented in *Section 3.4, Ground Water Resources*, as context for evaluating the potential impacts to ground water resources.

3.2.2.1.1 Regional Geologic History and Setting. The project area is located within the Basin and Range physiographic province, which covers much of interior western North America (see Map 3-1). The Basin and Range Province owes its descriptive name to the general geologic history common to this part of the country that has given rise to the present-day landscape of alternating generally north-south trending mountains separated by intervening valleys or basins.

Although the current landscape formed only during the past 10 to 20 million years, the geologic history of the region is much longer with important features dating to the Precambrian Era (more than 550 million years before present [Ma]). Igneous and metamorphic rocks of Precambrian age are the oldest and lowest unit in the regional stratigraphic column and are therefore commonly referred to as "basement." Early Cambrian age formations principally consisting of quartzite and shale are also typically considered basement primarily because of their relatively impermeable nature with respect to ground water flow (see *Section 3.4, Ground Water Resources*).

Throughout much of the Paleozoic Era, beginning in the early Cambrian time (around 500 Ma) and continuing into the Permian Period (approximately 250 Ma), present-day eastern and southern Nevada formed the continental shelf off of what was then the west coast of North America (the ancient shoreline ran through present-day western Utah). This shallow marine environment gave rise to the deposition of massive sequences of carbonate rocks (such as limestone and dolomites) that accumulated to thicknesses of as much as 30,000 feet. The area that formed the ancient continental shelf stretched from present-day southern Idaho, across eastern Nevada to southeastern California. The resulting carbonate deposits are exposed in many mountain ranges, and form a thick wedge, generally thinning eastward, that constitutes an extensive regional feature commonly referred to as the carbonate-rock province. The thickness and lithology (composition) of the Paleozoic carbonate rocks are notable in their homogeneity over large areas in the province. The carbonate-rock province is discussed further in *Section 3.4, Ground Water Resources*, with respect to ground water resources.

The Permian Period (between 240 and 290 Ma) generally marked the end of the environment that produced the thick deposits of carbonate rock, and by the middle Triassic (approximately 220 Ma) the continental margin had shifted westward so that present-day eastern Nevada was an area of continental deposition. Rocks of middle Triassic to Early Jurassic age in eastern Nevada, therefore, largely consist of sandstone, shale, and freshwater limestone.

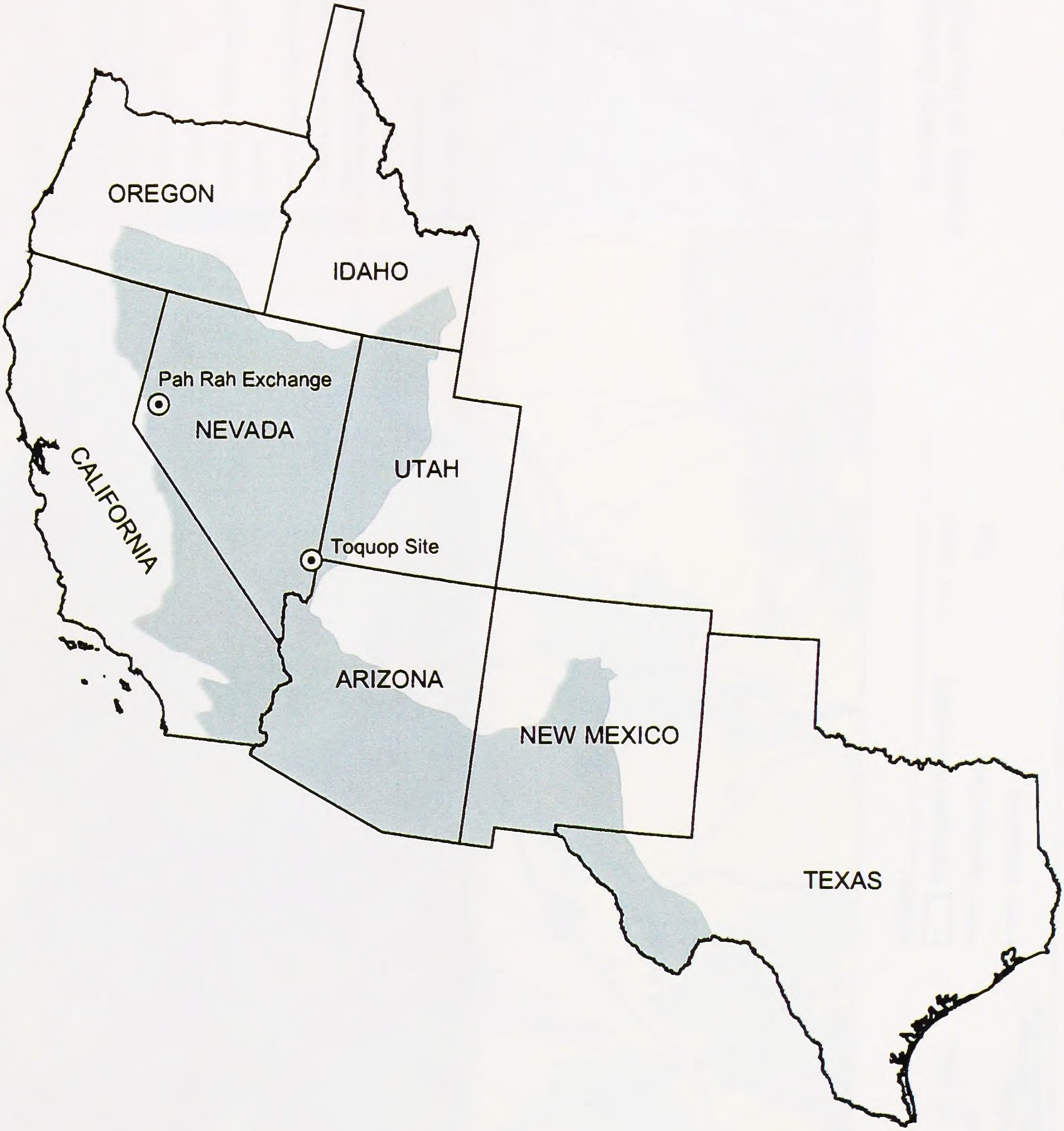
It was also during the late Mesozoic that the Sevier orogeny (period of mountain building) occurred that coincided with extensive regional compression of the earth's crust generally along the same belt that formed the ancient continental shelf during Paleozoic time (from southern Idaho through western Utah and southeastern Nevada and California). This period of crustal compression resulted in extensive folding and thrust faulting in which older (Paleozoic) rocks were pushed up and over younger (Mesozoic) rocks. In some cases, folding and thrust faulting resulted in doubling or tripling the total thickness of the Paleozoic carbonate rocks.

The geologic structure of the region became even more complex in the middle late Tertiary (starting around 20 Ma) when the tectonic forces reversed, resulting in crustal extension (stretching). The entire region underlying present-day eastern Nevada was essentially pulled apart by tensional forces. Large-scale normal (vertical offset) faulting caused huge blocks to be dropped, tilted, or rotated in response to being pulled apart or thinned. In addition to extensive normal faulting, nearly vertical strike-slip (lateral offset) faulting and widespread volcanism also occurred during middle and late Tertiary times. The overall result of the east-west extensional tectonics was that north-south oriented mountain ranges were raised and tilted, and basins formed in the intervening depressed areas. Erosion of the mountain ranges and the subsequent deposition of the erosional debris filled the valleys with several hundred to several thousand feet of sediment. The resulting parallel sequence of mountain ranges and intervening basins, interspersed with mountains of volcanic origin, combine to give the region its characteristic basin-range topography seen today.

3.2.2.1.2 Local Geology. Expressions of the aforementioned geologic history are exposed locally within and around the project area (see Map 3-2). The plant site under the Proposed Action is located on the northern flank of the lower Virgin River Valley, between the East Mormon Mountains to the west and the Tule Springs Hills to the north and northeast. Structurally, the lower Virgin River Valley consists of a deep tectonic basin referred to as the Virgin River Depression. With a depth of up to 6 miles, the Virgin River Depression is one of the deepest basins in the Basin and Range Province (Langenheim et al., 2001).

The substrate at the plant site consists of alluvial material of the Muddy Creek Formation, which is composed of the erosional debris from the surrounding uplifted areas. The Muddy Creek Formation comprises most of the upper basin-fill deposits of the lower Virgin River Valley, and outcrops just west of Mesquite have been described by Kowallis and Everett (1986) to be poorly sorted

H:\projects\toquop-water_toquop-eis.apr (Basin and Range Province Layout)



N

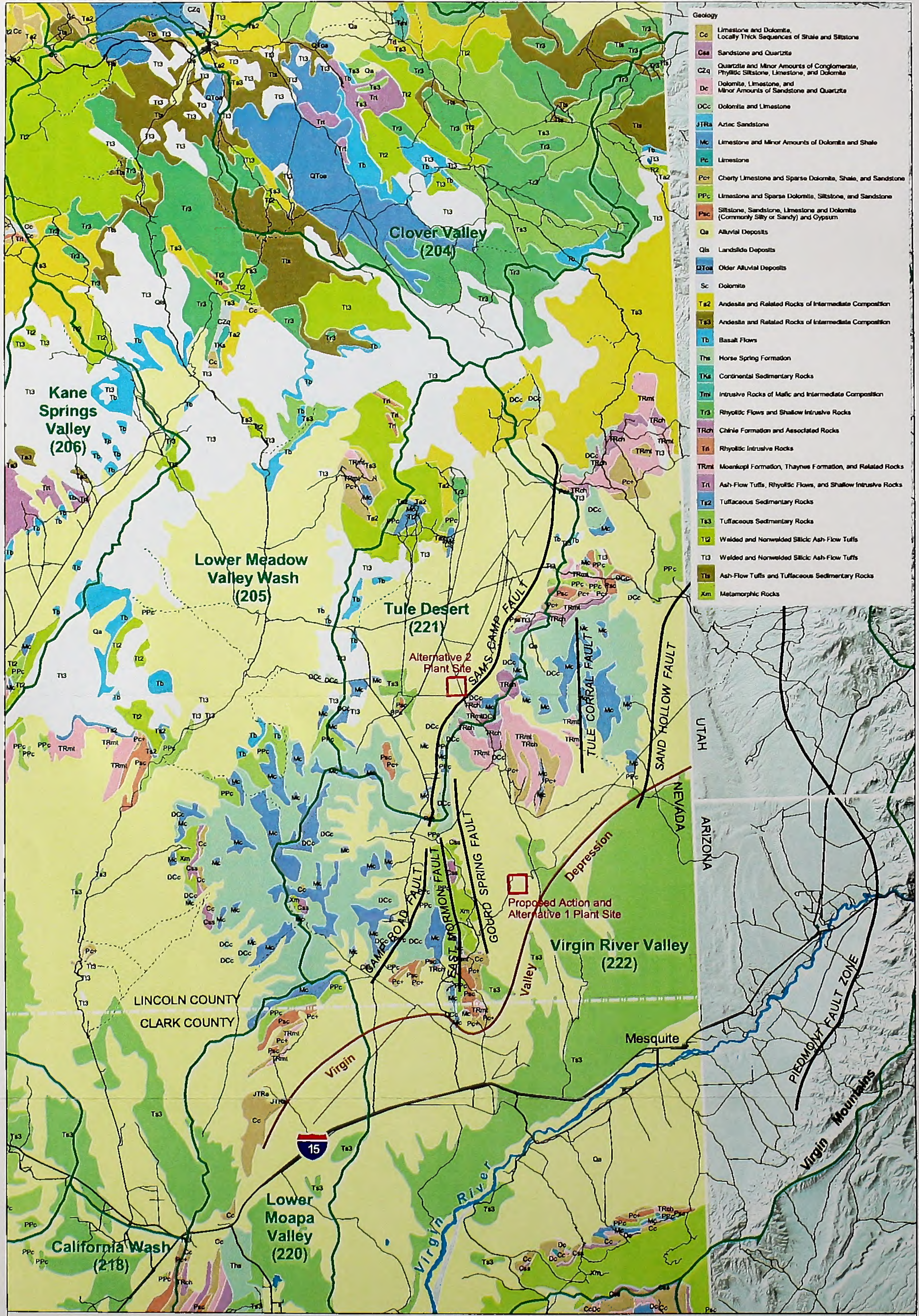
0 100 200 300 Miles

Location and General Extent of the Basin and Range Province

Source:
Fenneman's 1:7,000,000 Physical Divisions of the United States - USGS

Map 3-1

H:\projects\toquop-water_toquop-eis.apr (Geology Layout)


Geology
Cc Limestone and Dolomite, Locally Thick Sequences of Shale and Siltstone
Csa Sandstone and Quartzite
CZq Quartzite and Minor Amounts of Conglomerate, Phyllitic Siltstone, Limestone, and Dolomite
Dc Dolomite, Limestone, and Minor Amounts of Sandstone and Quartzite
DCc Dolomite and Limestone
JTRa Aztec Sandstone
Mc Limestone and Minor Amounts of Dolomite and Shale
Pc Limestone
Pc+ Cherty Limestone and Sparse Dolomite, Shale, and Sandstone
PPc Limestone and Sparse Dolomite, Siltstone, and Sandstone
Psc Siltstone, Sandstone, Limestone and Dolomite (Commonly Silty or Sandy) and Gypsum
Qa Alluvial Deposits
Qls Landslide Deposits
QToa Older Alluvial Deposits
Sc Dolomite
Ta2 Andesite and Related Rocks of Intermediate Composition
Ta3 Andesite and Related Rocks of Intermediate Composition
Tb Basalt Flows
Ths Horse Spring Formation
TKs Continental Sedimentary Rocks
Tmi Intrusive Rocks of Mafic and Intermediate Composition
Tr3 Rhyolitic Flows and Shallow Intrusive Rocks
TRch Chinle Formation and Associated Rocks
Tri Rhyolitic Intrusive Rocks
TRmt Moenkopi Formation, Thaynes Formation, and Related Rocks
Tt1 Ash-Flow Tuffs, Rhyolitic Flows, and Shallow Intrusive Rocks
Ts2 Tuffaceous Sedimentary Rocks
Ts3 Tuffaceous Sedimentary Rocks
Tt2 Welded and Nonwelded Silicic Ash-Flow Tuffs
Tt3 Welded and Nonwelded Silicic Ash-Flow Tuffs
Tts Ash-Flow Tuffs and Tuffaceous Sedimentary Rocks
Xm Metamorphic Rocks
Clover Valley (204)
Kane Springs Valley (206)
Lower Meadow Valley Wash (205)
Tule Desert (221)
Alternative 2 Plant Site
SAMS CAMP FAULT
TULE CORRAL FAULT
SAND HOLLOW FAULT
UTAH
NEVADA
ARIZONA
Depression
Proposed Action and Alternative 1 Plant Site
CAMP ROAD FAULT
EAST MORMON FAULT
GOURD SPRING FAULT
Virgin River Valley (222)
Valley
LINCOLN COUNTY
CLARK COUNTY
Virgin
Mesquite
15
PIEDMONT FAULT ZONE
Virgin Mountains
Virgin River
Lower Moapa Valley (220)
California Wash (218)
N
0
5
10 Miles
Legend
Hydrographic Boundary
Geologic Fault
Waterbody
Road
Trail

Sources: 1:100,000 Vactor Linework - BLM Nevada
1:500,000 Geologic Map of Nevada - USGS Reno
1:253,440 Geologic Map of Lime Mtn Quad - NBMG

General Geology in the Vicinity of the Project Area

Map 3-2

CH2MHILL

coarse to fine-grained sand and sandstone with siltstone and mudstone. At the plant site, ephemeral washes have cut into the formation exposing firmly cemented gravel conglomerate, at least 5 feet thick, within a few feet below the surface. The lateral extent of this calcium-carbonate cemented material is unknown, but is likely to be widespread in the vicinity of the plant site. This conglomerate layer is very hard and will likely require blasting to remove if excavation is required during construction. The need for blasting will depend on results of geotechnical investigations during final design.

Under the Proposed Action, the utility corridor passes through the Toquop Gap, which separates the East Mormon Mountains on the south from the Tule Springs Hills to the north. For Alternatives 1 and 2, the utility corridor passes directly through the Tule Springs Hills, which are prime examples of the extreme structural complexity that characterizes basin and range geology. The utility corridor for these alternatives follows the existing dirt road that snakes though a small topographic gap produced by massive local thrust faulting just south of Jumbled Mountain whose descriptive name portrays the complex local geology of the Tule Springs Hills.

The wellfield and the plant site under Alternative 2 lie within the Tule Desert, which is described in more detail in *Section 3.4, Ground Water Resources*. The near-surface substrate (up to approximately 1,000 feet deep) in the Tule Desert consists of unconsolidated alluvial basin-fill deposits, which were deposited as erosional debris from the surrounding uplifted areas. Based on test drilling within the wellfield area, the Tule Desert basin-fill deposits consist of principally unconsolidated coarse sands and gravel with some silt and clay within the uppermost 100 to 200 feet, but thereafter rapidly progress into a thick (greater than 500 feet) sequence of silts, clays, and sands. At depths of at least 600 feet, the proportion of coarse-grained sediments (silty sands and gravel) increases. Unlike at the plant site for the Proposed Action, no conglomerate or caliche (calcium carbonate) layers have been observed. Based on the local test drilling, the depth to consolidated rock is on the order of 1,000 feet.

3.2.2.1.3 Geologic Faults and Seismicity. The complex geologic history of the project area and its vicinity has resulted in numerous geologic faults along which both significant vertical and lateral offset has occurred in the distant past. Despite the extensive local faulting, however, few significant active faults occur in the vicinity of the project area.

The nearest, most significant, active faults are associated with the Piedmont fault zone. This fault zone, which cuts Pleistocene terrace deposits, runs along the northern base of the Virgin Mountains and extends along the western base of the Beaver Dam Mountains, approximately 20 miles south and east of the plant site for the Proposed Action.

Other mapped and named but inactive faults in the project area include the following:

- The Gourd Spring fault, which runs along the eastern base of the East Mormon Mountains

- The Sam's Camp fault, which parallels the Gourd Spring Fault along the west side of both the East Mormon Mountains and the Tule Springs Hills
- The Tule Corral fault, which runs north-south through the southern Tule Springs Hills
- The Sand Hollow fault, which cuts through the southern Tule Springs Hills and parallels the Tule Corral Fault approximately 10 miles to the east

In the vicinity of the plant site under the Proposed Action, numerous small unnamed vertical-offset faults have displaced Muddy Creek and younger (Quaternary age—less than 1.7 Ma) alluvial deposits. The local washes at the plant site (discussed in *Section 3.3, Surface Water Hydrology*) are thought to follow the trace of some of these faults, which are fairly evenly spaced (a few hundred to over 1,000 feet apart) and trend between north and north-northwest. Although these local small offsets are potentially active (having experienced movement in recent geologic time), any future displacement is not anticipated to result in a significant earthquake.

The current level of earthquake potential in southern Nevada is relatively low compared to more active parts of the Basin and Range Province (von Seggern and Brune, 2000). No major earthquakes (greater than a magnitude of 6.0) have been recorded within approximately 50 miles of the project area since at least 1868. A magnitude 6.1 quake did occur in 1966 near Caliente, however, approximately 62 miles north of the project area. Seismicity in southern Nevada is dominated by small earthquakes of less than magnitude 4.0, and these events have generally been associated with either the area around the Nevada Test Site (which suggests that those events are from past underground nuclear testing), or around Lake Mead. Small earthquakes near Lake Mead are thought to be related to stress imposed by the filling of the lake (Von Seggern and Brune, 2000).

Earthquake hazard maps developed by the U.S. Geological Survey (USGS) for southern Nevada indicate very low earthquake potential and associated ground acceleration in the vicinity of the project area.

3.2.2.2 Pah Rah Parcel

3.2.2.2.1 Local Geology. Situated near the western margin of the Basin and Range Province, the Pah Rah parcel is essentially the top of a mesa and its surrounding flanks, situated on the southeastern slope of the Pah Rah Mountains, in Washoe County, Nevada. The Pah Rah Mountains are volcanic, and the mesa on the parcel is primarily composed of Tertiary volcanic rocks consisting of basalt and andesite flows that range in age from 6 to 14 Ma, and volcanic rocks of the Pyramid Sequence, which are also primarily basalt of similar age (Green et al., 1991).

3.2.2.2.2 Geologic Faults and Seismicity. The geologic map of the Reno Quadrangle (Green et al., 1991), where the parcel is located, indicates that the Pah Rah Mountains contain numerous vertical displacement faults that are primarily oriented to the northeast. One such fault runs along the northwestern and northern edge of the parcel, along the northern flank of the mesa. The age and active status of this specific fault are unknown. In addition to the numerous faults within the Pah Rah Mountains, the Truckee River Valley, approximately 5 miles north and east of the parcel, appears to be fault controlled.

Earthquake hazard maps developed by the USGS for Nevada indicate that the potential for ground movement is moderately high in the vicinity of the Pah Rah parcel, but the associated level of ground acceleration is likely to be moderate.

3.3 Surface Water Hydrology

3.3.1 Toquop Area

This section provides context for the subsequent evaluation of potential project-induced environmental consequences to the surface water resources in the project area. Additional hydrologic information is presented in *Section 3.4, Ground Water Resources*.

3.3.1.1 Hydrologic Setting

The project area, which includes the Proposed Action, as well as Alternatives 1 and 2, is located within the Tule Desert and the Virgin River Valley hydrographic areas of the Colorado River Basin (see Map 3-3). All surface water within these areas ultimately flows toward the Colorado River (Lake Mead) via the Virgin River.

3.3.1.2 Local Climate

The arid climate of the project area reflects the desert environment that characterizes much of southeastern Nevada (see the discussion of local climate as it pertains to air resources in *Section 3.6.1.1.1, Climate and Meteorology*). In the higher elevations surrounding the project area the climatic regime transitions from arid to sub-alpine. Table 3-1 summarizes relevant statistics on climatic conditions representative of the project area and surrounding vicinity.

The project area is subject to extreme temperature variations between summer daytime highs, which can exceed 100°F for weeks at a time, and winter nighttime lows, which typically dip well below freezing during December and January.

Of particular importance to the surface water hydrology, however, is the amount and pattern of precipitation. On the local valley floors, and on the lower elevations of the surrounding mountains and hills, the average annual precipitation is significantly less than 10 inches per year (see Table 3-1). This precipitation falls as rain, typically during two different seasons. The greatest amount usually falls during the winter (January to March) as regional cold fronts from the west produce relatively long duration, but low intensity rainfall events. Precipitation is also likely to occur during the summer (July to September) as a result of generally localized, short duration, high intensity convectional storms (thunderstorms fueled by rising warm air masses).

With increasing elevation in the mountains that surround the project area, the amount of precipitation generally increases. Areas above 4,000 feet have annual precipitation totals that likely exceed 10 inches (Walker, 2002). Within the watershed of the Tule Desert, the Clover Mountains reach elevations of almost 7,000 feet. The corresponding precipitation amounts in these areas are estimated to average between roughly 13 and 16 inches per year (Walker, 2002).

TABLE 3-1
Summary of Climatic Statistics in the Vicinity of the Project Area

Location	Elevation (feet above mean sea level)	Average Annual Total Precipitation (inches)	Maximum Average Monthly Precipitation and Minimum Average Monthly Precipitation (inches)	Maximum Average Monthly Temperature and Minimum Average Monthly Temperature (°F)
Beaver Dam, Nevada[1] Period of Record: 8/1/1956-12/31/2000	1,900	7.8	1.03 (March) 0.18 (June)	105.6 (July) 31.6 (December)
Mesquite, Nevada[1] Period of Record: 1943-46, 1954-60, 1963	1,600	6.1	No record	No record
Bunkerville, Nevada[1] Period of Record: 12/1/1979-12/31/2000	1,550	6.3	1.03 (January) 0.17 (May and June)	105.5 (July) 28.9 (December)
Elgin, Nevada (SE)[1] Period of Record: 5/1/1965-6/30/1985	3,300	16.8	2.52 (March) 0.14 (June and July)	100.1 (July) 30.7 (December and January)
Elgin, Nevada[1] Period of Record: 3/1/1951-12/31/2000	3,400	14.0	2.21 (February) 0.42 (June)	97.9 (July) 27.7 (December)
Carp, Nevada[2] Period of Record: 1950, 1952-54, 1956, 1962	2,625	4.0	No record	No record

Sources:
[1]Western U.S. Climate Historical Summaries, Western Regional Climate Center, Desert Research Institute, Division of Atmospheric Sciences.
[2]Glancy and Van Denburgh (1969)

Surface evaporation rates run counter to local precipitation amounts, and are relatively high. On the local valley floors, the average annual surface evaporation is considerably higher than the average annual rainfall primarily because the generally high air temperatures and the typically low relative humidity in the arid valleys. On the floor of the Virgin River Valley, for example, the annual evaporation rate has been reported by Woessner, et al. (1981), to be approximately 80 inches, or roughly 27 times the average annual precipitation at a similar location.

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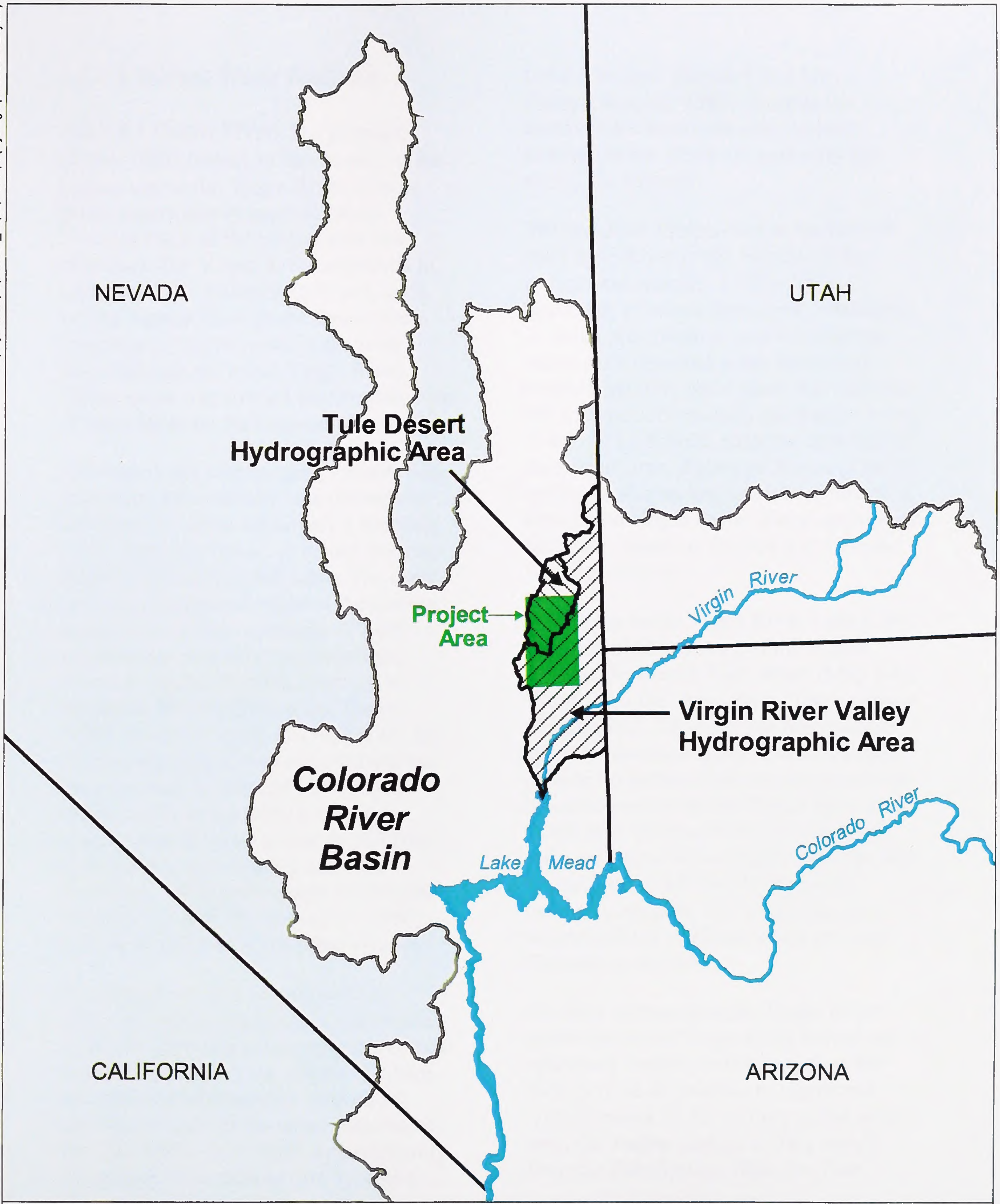


N

0 20 40 60 Miles

Sources: 1:100,000 Vector Linework - BLM Nevada
1:250,000 Hydrologic Units - USGS WRD

Hydrographic Areas in the Vicinity of the Project Area

Map 3-3

CH2MHILL

3.3.1.3 Surface Water Features

3.3.1.3.1 Virgin River. The principal surface water feature in the vicinity of the project area is the Virgin River, which flows southwesterly approximately 13 miles south of the project area (see Map 3-4). The Virgin River originates in Utah near Zion National Park and, upon exiting a gorge through the Beaver Dam Mountains ("the Narrows"), the river flows through the lower Virgin River Valley on its way toward the Overton Arm of Lake Mead on the Colorado River.

The flow in the river is quite variable both seasonally and annually, and differences in the reported values are largely a function of the particular period of record that corresponds to the reported value. The most consistently reported value of the average annual flow is approximately 177,000 acre-feet per year (afy), at Littlefield, Arizona, roughly 9 miles upstream of Mesquite, Nevada (Dixon and Katzer, 2002). A similar value of 174,000 afy for the average annual flow at Littlefield has been reported by Metcalf (1995); and Black and Rascona (1991). However, average annual flows as low as 162,200 acre-feet per year (Glancy and Van Denburgh, 1969) and as high as 193,300 acre-feet per year (Holmes et al., 1997) have been reported at the same location.

Seasonal flows in the river generally reflect the prevailing climatic conditions with peak flows corresponding to the local winter rainy season, the effects of which are typically prolonged by periods of spring snowmelt in the upper portions of the river basin. As a result, approximately 50 percent of the annual flow typically occurs between February and May (Woessner et al., 1981). Despite the tendency for locally intense summer thunderstorms, flows are generally low during the summer.

The principal components to the flow of the Virgin River in the vicinity of the project area include: 1) flow from upstream; 2) inflow from local tributaries; 3) direct precipitation; and 4) irrigation return flow (residual water applied to crops in the river flood plain that infiltrates the soil and subsequently discharges to the river). At Littlefield, Arizona, upstream of the project area, discharge from a series of springs is also an important component of flow in the Virgin River. These springs are discussed further in *Section 3.4, Ground Water Resources*.

Within the lower Virgin River Valley, the only perennial tributary of the Virgin River is the Beaver Dam Wash (Map 3-4), which joins the Virgin River just upstream of Littlefield. Although the Beaver Dam Wash is perennial along several reaches, little or no surface flow actually occurs at the confluence with the Virgin River most of the year. Estimated annual discharge rates for this wash are highly variable, but the long-term (1970 to 1994) annual average is roughly 12.5 cubic feet per second (cfs) or 9,000 acre-feet per year (Holmes et al., 1997).

All other tributaries to the Virgin River within the lower Virgin River Valley are ephemeral washes, which only flow for short periods in response to significant rainfall events. In the vicinity of the project area, the washes capture surface runoff from the Tule Springs Hills, the Tule

Desert, and the Mormon and East Mormon mountains, and flow generally southward toward the river. Although approximately six named washes in the vicinity of the project area drain into the Virgin River (see Map 3-4), the Toquop Wash and its tributaries, discussed below, are the most important within the project area.

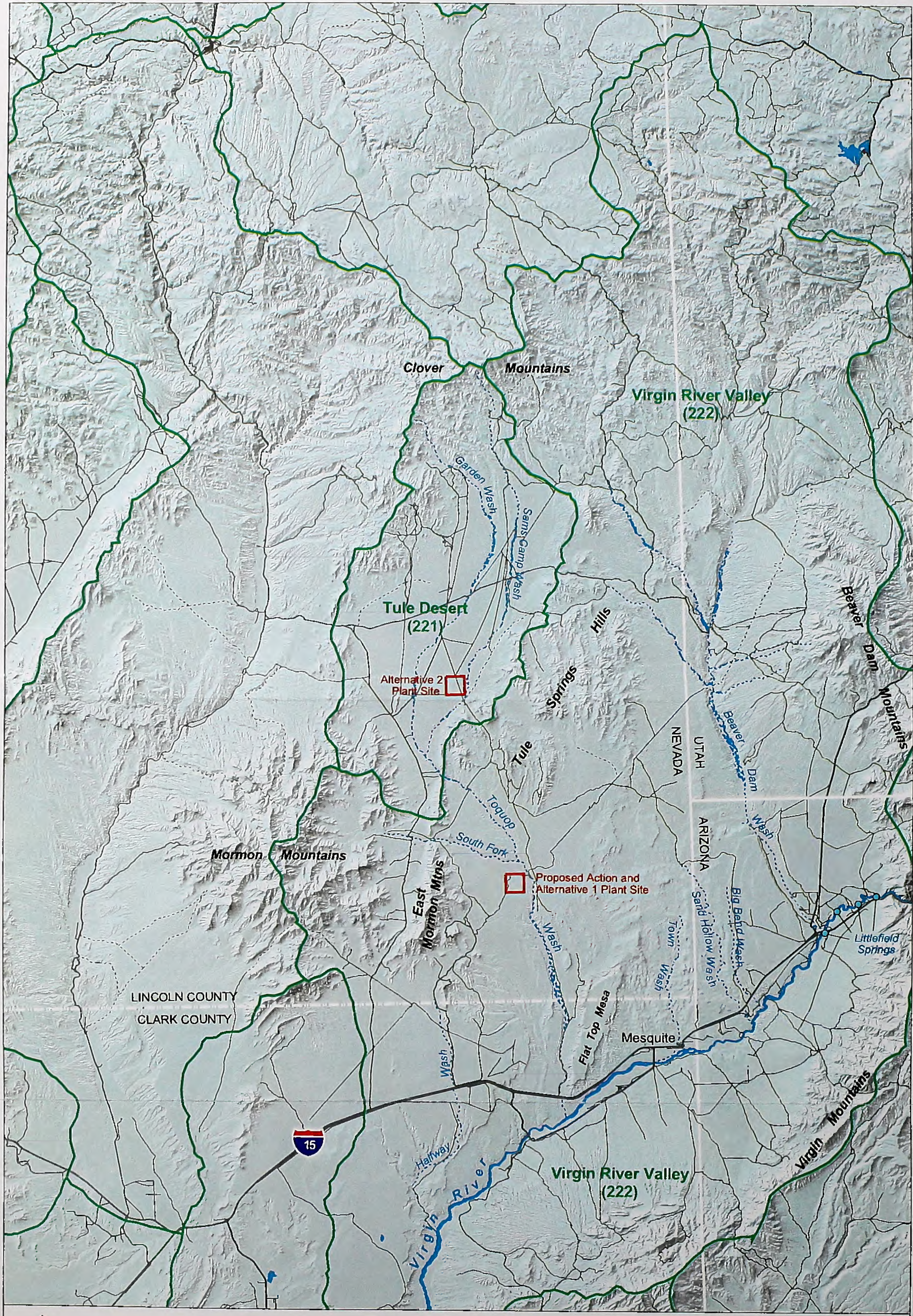
As it proceeds toward Lake Mead, flow in the Virgin River decreases as a result of:
1) consumptive use (through irrigation and other agricultural water demands);
2) evapotranspiration (the combined effect of direct evaporation and transpiration by natural vegetation along the river); and
3) infiltration into the local ground water system (Glancy and Van Denburgh 1969; Woessner et al. 1981; Black and Rascona 1991).

Specifically, portions of the Virgin River are diverted for irrigation at Mesquite, Bunkerville, and Riverside. These three diversions are estimated to reduce the river flow collectively by approximately 20 percent or 38,000 acre-feet per year (Woessner et al., 1981). Historically, this has meant that some of the time all of the available water has been diverted during periods of low flow (June through August).

These diversions, together with evapotranspiration and infiltration, cause the river to lose flow as it makes its way toward Lake Mead because essentially no water enters the river downstream of the Beaver Dam Wash and the Littlefield springs, apart from seasonal inflows from the ephemeral washes such as Toquop, and return flows from excess irrigation water. Specific studies on the interaction between ground water and the Virgin River have concluded that, between Littlefield and its confluence with Lake Mead, the river basically is "losing" flow (water from the river infiltrates the subsurface and recharges ground water, as opposed to a "gaining" river, which receives inflow from ground water) (Glancy and Van Denburgh, 1969; Woessner et al., 1981; Metcalf, 1995; Las Vegas Valley Water District, 1992). Further discussion on the ground water/surface water interaction in the Virgin River Valley is presented in *Section 3.4, Ground Water Resources*, and CH2M HILL (2002).

Compared with the average flow at Littlefield (177,000 acre-feet per year, see above), the Virgin River at its mouth in the Overton Arm of Lake Mead was estimated to be approximately 80,000 acre-feet per year by Glancy and Van Denburgh (1969). They further report that, very little, if any, of this Virgin River flow reaches Lake Mead during the summer. Actual reported data at the mouth of the river, however, are limited. A single measurement of flow of approximately 17,400 acre-feet per year was reported by Metcalf (1995) for October, 1992. In addition, an average value of flow of 138,420 acre-feet per year was reported by Woessner et al. (1981), based only on data from June 1980 to May 1981. This value of flow is approximately 86 percent of the value of flow at Littlefield over the same period.

3.3.1.3.2 Tule Desert and Toquop Wash. The proposed plant site under Alternative 2, and the wellfield under all project alternatives, are within the Tule Desert hydrographic area (Map 3-4). All surface drainage from the Tule Desert, and ultimately from all other portions of the project area, is carried by the Toquop Wash, which flows south-southeast to the Virgin River.



N

0 5 10 Miles

Legend

🟩 Hydrographic Boundary
------ Wash or Ephemeral Drainage
—— Waterbody
—— Road
------ Trail

Sources: 1:100,000 Vector Linework - BLM Nevada
USGS National Elevation Dataset

Surface Water Features in the Vicinity of the Project Area

Map 3-4

CH2MHILL

Within the Tule Desert, numerous small unnamed washes direct localized surface runoff into progressively larger tributaries of the Toquop Wash. Two of the larger tributaries of the Toquop Wash within the Tule Desert are Garden and Sam's Camp washes, which both originate at the base of the Clover Mountains (see Map 3-4).

As with all of the other tributaries to the Virgin River below Littlefield, the Toquop Wash is ephemeral and flows only for short durations as a result of significant precipitation events. Although flow of the Toquop Wash has not been directly quantified, it has been estimated by Glancy and Van Denburgh (1969) to contribute an average of approximately 1,400 acre-feet per year to the Virgin River.

3.3.1.3.3 Local Springs. Several small springs are located in the mountains and hills that surround the project area. The discharge from these springs, however, does not contribute to surface flows in the Toquop Wash or any of its tributaries. The discharge from these springs typically is very low (all are less than 1 gallon per minute [gpm] and most are less than half that rate), and if not captured for stock water, either evaporates directly or soaks into the ground where it subsequently evaporates or is lost through transpiration by plants. Similarly, these springs do not contribute to flows in the Virgin River. Further identification and discussion of these springs is presented relative to ground water resources in *Section 3.4, Ground Water Resources.*

3.3.1.3.4 Proposed Action Plant Site. Six small, parallel, unnamed washes, spaced approximately 1,000 feet apart, direct surface runoff southeast toward a larger unnamed tributary wash, which joins the Toquop Wash approximately 1 mile southeast of the plant site.

Approximately 1 mile north of the plant site, the South Fork Toquop Wash joins the Toquop Wash (see Map 3-4). The South Fork is the largest tributary of the Toquop Wash, and drains much of the eastern Mormon Mountains and the northern East Mormon Mountains.

3.3.1.4 Relevant Floodplain Delineation

The entire project area is located within a Zone D Floodplain, as defined by the Federal Emergency Management Agency (FEMA) floodplain maps. Zone D floodplains are defined as "areas of undetermined, but possible, flood hazards" (Map Index Community Panel Number 3200140001-5525). As a result, no portion of the plant site under the proposed action is actually within a specified floodplain.

3.3.1.5 Water Quality

The Virgin River is generally characterized by high concentrations of total dissolved solids (TDS) on the order of 1,000 to 3,000 milligrams per liter (mg/L) (Glancy and Van Denburgh 1969; Woessner et al 1981). Composed mainly of calcium, sodium, sulfate, and chloride, the concentration of TDS shows a strong inverse correlation with the flow of the river. Concentrations of TDS are most dilute when flows are the highest, and tend to increase during periods of low flow. During low-flow periods, the flow in the river is dominated by discharges from springs with high TDS concentrations and irrigation return flows, which also tend to concentrate salts. In addition, because the quantity of irrigation return flows increases with distance downstream along reaches where irrigated agriculture is present, the concentration of TDS has similarly been shown to increase with distance downstream for the same reaches (Glancy and Van Denburgh, 1969; Woessner et al., 1981). Specifically, a 30 percent increase (between 2,000 mg/L and 2,700 mg/L) in TDS concentration between Littlefield and Riverside was reported by Glancy and Van Denburgh (1969).

In addition to dissolved minerals, the Virgin River carries a large quantity of suspended solids that gives it its characteristic muddy appearance. The material in suspension is largely silt- and clay-sized particles, while the transported material along the river bed is largely sand-size. The average annual quantity of suspended material passing by Littlefield is reported to be 2.7 million tons, with the minimum reported value being less than 1 million tons and the maximum value over 6 million tons (Glancy and Van Denburgh, 1969).

3.3.2 Pah Rah Parcel

The climate of Washoe County, where the Pah Rah parcel is located, is mild with low humidity and rainfall and characterized as semi-arid to arid. Although the Pah Rah parcel is located within the Truckee River Basin, there are no surface water features at or near the parcel including any significant ephemeral drainages or springs. The Truckee River, which flows west to east before turning north and terminating at Pyramid Lake, is approximately 1.5 miles north of the parcel and is not connected to the parcel.

3.4 Ground Water Resources

This section provides context for the evaluation of potential project-induced environmental consequences to the local ground water resources in the project area. The ground water environment, both regional and local to the project area, is directly linked to the geological conditions described in *Section 3.2, Soils and Geology*. The relationship between ground water and surface flows in the Virgin River is also discussed in this section as it relates to potential project-induced impacts. A separate technical report on the regional and local hydrogeology, the *Water Resources Technical Report* (CH2M HILL, 2002) has been prepared. The report provides more detailed discussion and analysis of many of the ground water related topics presented in this EIS.

3.4.1 Regional Conditions

3.4.1.1 Setting

The project area is located within the Tule Desert and Virgin River Valley hydrographic areas (see Map 3-5), within the Basin and Range physiographic province (see *Section 3.2, Soils and Geology*).

The Tule Desert is the location of the wellfield in the Proposed Action. Elongated in a generally north-northeast direction, the Tule Desert is a singular topographic basin that is surrounded by the Clover Mountains to the north and northwest, the Tule Springs Hills to the east, and the East Mormon and Mormon mountains to the south and southwest, respectively. Covering an area of approximately 125,000 acres, the Tule Desert is approximately 32 miles long and 12 miles across. The floor of the Tule Desert slopes from all directions toward the Toquop Gap, which separates the East

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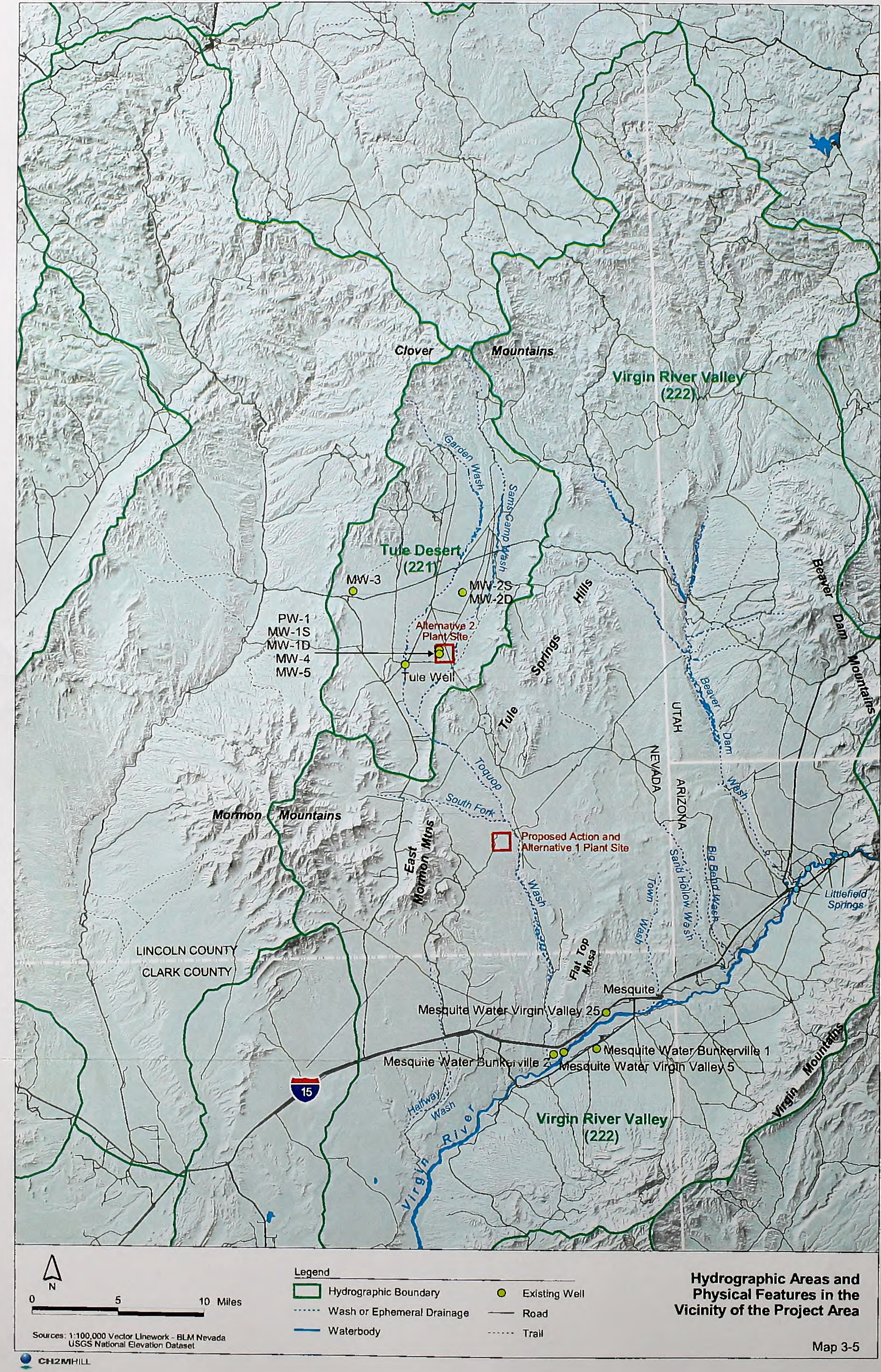


Sources: 1:100,000 Vector Linework - BLM Nevada
USGS National Elevation Dataset

Hydrographic Areas and Physical Features in the Vicinity of the Project Area

Map 3-5

CH2MHILL

Mormon Mountains from the Tule Springs Hills. The Toquop Gap forms the only natural hydrologic outlet from the Tule Desert, and it is through this low-lying area that the Toquop Wash drains ephemeral surface water runoff from the Tule Desert (see *Section 3.3, Surface Water Hydrology*).

The plant site under the Proposed Action is located within the Virgin River Valley, which abuts the Tule Desert to the north and similarly forms a singular topographic basin in which all surface water drainage is toward the Virgin River and Lake Mead. Technically, the Virgin River Valley extends from the Tule Desert east to the Beaver Dam Mountains in Utah and south to the Virgin Mountains in Arizona. Geologically, much of the Virgin River Valley sits above a deep tectonic basin in which the underlying bedrock is as much as 6 miles below the valley floor (see *Section 3.2, Soils and Geology*).

3.4.1.2 Ground Water Occurrence

3.4.1.2.1 Basin and Range Province. Within the Basin and Range Province, ground water occurs in both the sediments that have filled the valleys to their current elevations (basin-fill deposits) and the underlying rock that also comprises the surrounding hills and mountains. In the Tule Desert and Virgin River Valley, ground water is, therefore, stored and conveyed through two principal aquifer systems: 1) saturated, poorly consolidated basin-fill deposits, consisting mainly of silty and clayey sands with occasional clay and gravel layers, locally represented by the Muddy Creek Formation (see *Section 3.2, Soils and Geology*) the underlying fractured sedimentary (for example, limestone, dolomite) or volcanic rocks.

In the Basin and Range Province, basin-fill aquifer systems are typically very localized and relatively shallow. Ground water in these deposits generally flows in directions that coincide with decreasing ground-surface elevations (that is, "downhill"). Ground water can flow between hydrographic areas, or basins, where the basin-fill deposits from adjacent areas merge, such as at the Toquop Gap where the basin-fill deposits of the Tule Desert are continuous with those of the Virgin River Valley.

The underlying fractured-rock aquifer systems, on the other hand, are regional features in which ground water flows irrespective of the local topography and hydrographic-area boundaries. Ground water in the deep fractured-rock systems flows in response to regionally controlled hydraulic gradients driven by regional recharge and discharge areas, and is generally not significantly influenced by conditions in the overlying basin-fill aquifer systems. In addition, although individual rock formations are laterally discontinuous and typically highly deformed structurally, the basic rock types are essentially continuous and transcend the boundaries of the hydrographic areas. As a result, it is very difficult, if not impossible, to place lateral bounds around the fractured-rock aquifer systems. Further discussion on the basic principles of flow through fractured rock is presented in the *Water Resources Technical Report* (CH2M HILL, 2002).

3.4.1.2.2 Carbonate-Rock Province. As described in *Section 3.2, Soils and Geology*, a substantial portion (approximately 200 million years) of the geologic history of this part of the Basin and Range Province involved the deposition of massive sequences of carbonate rocks (limestone and dolomite) over a wide area of present-day eastern Nevada, western Utah, and the northwestern tip of Arizona. Because such a large area has this common geologic past as much as 50,000 square miles in Nevada alone, this portion of the Basin and Range Province is also commonly referred to as the carbonate-rock province (Mifflin and Hess, 1979; Dettinger et al, 1995; Prudic et al., 1995).

Inasmuch as the carbonate-rock province is a descriptive term primarily used by hydrogeologists, its definition also includes a reference to ground water. Specifically, Dettinger et al. (1995) describe the carbonate-rock province as, "…that part of the Basin and Range Province in which ground water flow is predominately or strongly influenced by carbonate-rock aquifers of Paleozoic age."

According to Dettinger et al. (1995, Figure 1) and Plume (1996, Figure 2), the Tule Desert and Virgin River Valley hydrographic areas are located just within the southeastern edge of the carbonate-rock province. However, as discussed in *Section 3.4.2, Local Conditions*, Paleozoic carbonate rocks, while they comprise a significant portion of the local mountains and hills that rim the Tule Desert, do not necessarily comprise the shallowest fractured-rock aquifer formations within the Tule Desert and Virgin River Valley hydrographic areas.

Dominated by limestones and dolomites, the carbonate rocks in this region are brittle and subject to fracturing, and under the right geochemical conditions can dissolve and form cavities that further enhance the ability of these rocks to store and transmit ground water. The large geographic area underlain by these carbonate rocks, together with their demonstrated capacity to transmit large volumes of ground water, is evidence that the carbonate rocks of Nevada comprise aquifer systems of regional scale and significance (Dettinger et al., 1995).

Because of their significance, the aquifer systems of the carbonate-rock province have been studied extensively on a regional scale by the U.S. Geological Survey (USGS) (Harrill and Prudic, 1998). Computer models of the regional carbonate aquifer systems developed by the USGS indicate that the total volume of ground water that flows through these aquifers over the entire carbonate rock province is about 1.5 million acre-feet per year (afy), based on fairly sparse data. Specifically, within the Nevada portion of the Colorado River Basin, the flow through the carbonate aquifer is estimated by the USGS to be more than 200,000 afy. These estimates are based on very general assumptions for conditions in the Tule Desert and Virgin River Valley for which there were no available data on the carbonate rock aquifer system in these areas at the time of those analyses.

3.4.2 Local Conditions

3.4.2.1 Tule Desert Hydrogeology

General descriptions and inferences on the hydrogeologic conditions of the Tule Desert area are found in the published literature dating back to the early 20th century (for example, Carpenter [1915]). Until recently, however, very little specific data were available because the ground water resources of the Tule Desert have been only minimally developed.

As part of the investigation of the feasibility of using ground water from the Tule Desert for the proposed power plant alternatives, several monitoring wells (MW-1 through MW-5) and one pilot production well (PW-1) have been installed, sampled, and tested in the area of the proposed wellfield (see Map 3-5). MW-1 and MW-2 consist of nested wells (one well screened in the basin fill [shallow] and one well screened in the fractured rock [deep]) within a common borehole. MW-3 and MW-4 are individual monitoring wells screened in the fractured rock, and MW-5 is screened in the basin fill. Much of the information presented in this section comes from that fieldwork, the details of which are presented in CH2M HILL (2002).

3.4.2.1.1 Ground Water in the Basin-Fill. Based on the logs of boreholes drilled in the wellfield area, the basin-fill in the Tule Desert consists of older alluvium of probable Pleistocene age (approximately 10,000 to 1.7 million years old [Ma], and perhaps Pliocene age [approximately 1.7 to 5 Ma]), that was deposited as erosional debris from the surrounding up-faulted areas (see *Section 3.2, Soils and Geology*). Although these deposits consist principally of unconsolidated coarse sands and gravel with some silt and clay within the uppermost 100 to 200 feet, they typically transition rapidly thereafter to a massive sequence dominated by either silty or clayey sands that is 300 or more feet thick. In some locations, layers of coarse-grained sediments (silty sands and gravel) and layers of clay occur at depths of 600 feet or more (CH2M HILL, 2002).

In addition, the available data suggest that although a general pattern to the layering is discernable, discrete layers within the basin-fill deposits are laterally discontinuous. Consequently, although the lower portions of the basin-fill are saturated, a single continuous aquifer unit is difficult to identify. In addition, ground water is likely to be locally perched (that is, it occurs as laterally discontinuous pockets of saturated sediments that are independent of a specific basin-fill aquifer).

Further evidence of the complexity of the ground water conditions within the basin-fill deposits comes from the available ground water-level data. In addition to revealing that the depth to ground water in the basin-fill is generally very deep, the water-level data also confirm the likelihood of more than one ground water-containing zone within these deposits (for example, perched ground water). Specifically, the available data reveal depths to ground water (as of February 2002) of approximately 390 feet (Tule Well), 496 feet (MW-2 [shallow]), and 718 feet (MW-5).

Results from geophysical studies reported in Langenheim et al. (2001) indicate that the thickness of the basin-fill deposits generally increases toward the center of the Tule Desert. The results in Langenheim et al. (2001), however, also suggest that the top of the fractured rock is highly irregular with localized ridges and depressions. This is confirmed by the logs from the test borings in the wellfield area that indicate that the top of consolidated rock occurs at depths of between roughly 800 feet (MW-3) and 850 feet (MW-1, MW-4, and PW-1) to 1,200 feet (MW-2). These depths indicate that the maximum saturated thickness of the basin-fill deposits is similarly quite variable, ranging from approximately 132 feet at MW-5 to 700 feet at MW-2.

The total volume of ground water in storage within the uppermost 100 feet of saturated sediments in the Tule Desert has been estimated by NDWR (1971) to be approximately 530,000 acre-feet, based on a specific yield of 10 percent.

Recharge to ground water in the Tule Desert basin-fill deposits comes from direct precipitation on the surrounding upland areas, particularly those portions of the Clover Mountains and Tule Springs Hills that are within the watershed of the Tule Desert. Precipitation in these areas percolates down through the subsurface and reaches ground water in amounts proportional to elevation (that is, as elevation increases, so does the proportion that precipitation contributes to recharge).

Consistent with the approach most commonly taken in the hydrologic literature (Maxey and Eakin, 1949; Glancy and Van Denburgh, 1969; Prudic et al., 1995), precipitation that falls on the valley floor is conservatively assumed not to infiltrate and recharge ground water primarily because of the high potential for evaporation (see *Section 3.2, Surface Water Hydrology*). Dixon and Katzer (2002), however, believe that significant ground water recharge occurs through the infiltration of runoff in the principal ephemeral washes that feed the Toquop Wash (as well as from the Toquop Wash itself).

Specific estimates of ground water recharge in the Tule Desert vary from 2,100 afy (Glancy and Van Denburgh, 1969) to approximately 8,100 afy (Walker, 2002). Recharge to the basin-fill deposits could also be occurring through upward leakage from the underlying fractured-rock aquifer, but this potential recharge component has not been quantified. The potential for interconnection between ground water in the basin-fill and the underlying rock is addressed further in the section below and in CH2M HILL (2002), which also contains further elaboration on recharge estimates.

Within the Tule Desert, ground water is believed to flow through the basin-fill deposits toward the Toquop Gap, where some portion of the basin-fill ground water leaves the Tule Desert hydrographic area and enters the Virgin River Valley hydrographic area. The Toquop Gap, however, is too small to accommodate all of the basin-fill ground water discharge that, along with current local withdrawals and locally recharged spring flows, must balance the recharge estimates (that is, high-end estimates of the range of potential discharge rates through the basin-fill deposits in the Toquop Gap are much less than 10 afy [CH2M HILL, 2002]). Therefore, some ground water in the basin-fill deposits must enter the underlying fractured-rock aquifer system and flow into the Virgin River Valley through that medium.

3.4.2.1.2 Ground Water in the Fractured Rock. The structural complexity that is evident in the surrounding Tule Springs Hills is mirrored, to a certain degree, in the fractured-rock that underlies the Tule Desert basin-fill deposits. Accordingly, the specific composition of the fractured-rock aquifer in the Tule Desert varies laterally across the basin as a result of vertical offset from faulting and local deposits of volcanic.

Detailed descriptions of the rocks encountered in the test boreholes in the proposed wellfield area are presented in the *Water Resources Technical Report* (CH2M HILL, 2002). In general the upper-most rock formation encountered is predominately composed of gray limestone interfingered with brown and red limey siltstone and bands of gray quartzite down to a depth of 2,000 feet in the vicinity of PW-1, MW-1, and MW-4.

To the north, in the vicinity of MW-2, the limestone component is generally absent and the limy siltstone component predominates.

The composition of the rocks in the vicinity of PW-1, MW-1, and MW-4 is generally consistent with descriptions of the Triassic-aged (205 to 240 Ma) Moenkopi Formation as reported in the geologic literature (Tschanz and Pampeyan, 1970; Plume, 1996). The siltstone component is also similar to outcrops of the Moenkopi Formation in the Tule Springs Hills just east of the wellfield area (see Map 3-2). The Moenkopi is identified as being the uppermost (youngest) formation that contains aquifers in carbonate rock (Plume, 1996, Table 1). This is consistent with the predominance of limestone encountered in the boreholes in the vicinity of PW-1 and is supported by local water chemistry data, discussed below, which indicate that ground water from the fractured rock at the location of PW-1 and MW-4 is directly related to ground water in the regional carbonate aquifer system.

To the west at MW-3, Tertiary aged volcanic rocks are present to a depth of 2,000 feet. These volcanic rocks are part of the Clover Mountains, and include discrete layers of basalt, rhyolite, and tuff, interspersed with layers of clay up to 200 feet thick. These volcanic rocks likely extend under much of the northern third of the Tule Desert, and also likely comprise the bedrock beneath the basin fill south of the northern third of the Tule Desert along the eastern edge of the Clover Mountains.

All of the rock types encountered in the boreholes (limestone, siltstone, quartzite, and the various volcanic rocks) show evidence of fracturing, thus providing the void space to store and transmit ground water.

Despite the variation in the rock types that comprise the fractured-rock aquifer within the Tule Desert, ground water chemistry data, discussed in *Section 4.2.1.3, Ground Water Quality*, indicate a common ground water flow system within the different rock types, except at MW-3, as discussed below. For example, values of deuterium (a stable isotope of hydrogen contained in water molecules), which are used to help differentiate between waters of different origins (see CH2M HILL, 2002; *Appendix A*), indicate similarities between ground water in an upgradient well MW-2 (deep), where fractured siltstone dominates, and ground water in downgradient wells PW-1 and MW-4, where carbonate rocks dominate. In both rock types, the ground water is highly depleted in deuterium. Specifically, deuterium values range from -98 per mil in MW-2 (deep) to -103 per mil in MW-4.

In addition, these water chemistry data also indicate a linkage between the ground water in the Tule Desert fractured-rock aquifer and regional carbonate-aquifer ground water. Along with being highly depleted in deuterium, the chloride concentrations are very low (approximately 8 mg/L) in both PW-1 and MW-4. The chloride data for MW-2 (deep) are considered to be unreliable (CH2M HILL, 2002). These data collectively comprise a unique chemical signature that is only duplicated in ground water of the regional carbonate-aquifer system, which is similarly highly depleted in deuterium and typically does not provide a source of chloride (CH2M HILL, 2002).

Further evidence that ground water in the fractured rock that underlies the Tule

Desert basin-fill is part of the regional aquifer system of the carbonate-rock province comes from carbon-14 (C-14) data. The application of C-14 data, which have been widely used for several decades to date items and substances containing carbon, is presented in CH2M HILL (2002), Appendix A. The C-14 data from PW-1 indicate that the ground water in the fractured-rock at this location is very old because the unstable carbon content has almost completely decayed (0.9 percent modern carbon). In other words, the ground water from PW-1 originated as precipitation many tens of thousands of years ago and has taken that long to travel to the point where it could be extracted by PW-1. Ground water of this age is consistent with the age of ground water in the regional carbonate-aquifer system, which similarly requires several thousand years to flow from the point of recharge across the carbonate-rock province.

Table 3-2 presents water-level data from fractured-rock wells in the Tule Desert.

These data indicate that water levels in wells that penetrate the fractured rock are typically very deep, but remain above the top of rock—further indicating that the ground water in the fractured rock is

TABLE 3-2
Ground Water Levels in the Fractured-Rock Aquifer in the Tule Desert

Well	Screened Interval (feet below surface)	Depth to Water (feet)	Water Level Elevation (feet above mean sea level)	Date
PW-1	1,000 to 1,160 1,200 to 1,240 1,340 to 1,380 1,440 to 1,480 1,500 to 1,520 1,540 to 1,560 1,580 to 1,780	724.2	2495.8	February 17, 2002
MW-2	1,435 to 1,540	506	3044	November 20, 2001
MW-3	920 to 960 1,000 to 1,060 1,100 to 1,140 1,480 to 1,520 1,700 to 1,760 1,800 to 1,840 1,920 to 1,980	484	3036	February 16, 2002
MW-4	1,108 to 1,148	718	2501	February 27, 2002

confined under pressure. This conclusion that the ground water is under pressure in the fractured rock is confirmed by the water level data from immediately adjacent basin-fill wells. These data reveal water levels that are different that the water levels in the rock.

When displayed spatially on a map, the water-level data from fractured rock also indicate that the horizontal component of the hydraulic gradient within the fractured rock is oriented in a southerly direction within the Tule Desert (CH2M HILL, 2002). The magnitude of the horizontal component of hydraulic gradient is approximately 0.02, which is very steep but consistent with the relatively poor ability of the fractured rock to transmit water as discussed below.

Although the direction of ground water flow is dictated locally by the orientation of individual fractures, the direction of ground water flow is considered to be generally parallel to the direction of hydraulic gradient at the scale of the entire hydrographic area. In other words, the available water-level data indicate that ground water flows south through the Tule Desert.

These results are consistent with the findings of regional studies on the carbonate-rock aquifer systems that have concluded that the regional ground water flow in the fractured-rock aquifer is generally south in the vicinity of the Tule Desert and the northern portions of the Virgin River Valley hydrographic areas (Harrill and Prudic, 1998; Dettinger, 1992; Prudic et al., 1995).

Unlike ground water in the basin-fill deposits, ground water in the fractured rock is recharged in part outside the hydrographic area. Comparisons of water-chemistry data from springs and wells north of the Tule Desert with similar data from the test wells in the proposed wellfield area indicate that ground water enters the Tule Desert fractured-rock aquifer north of the Clover Mountains.

Specifically, as mentioned above, the chemical signature of the ground water in the fractured rock at PW-1 and MW-4 is very unique and is defined by the combination of highly depleted deuterium values (-103 per mil) and very low chloride concentrations (approximately 8 mg/L). Ground water from MW-2 (deep) is also highly depleted in deuterium (-98 per mil), but reliable chloride data from this fractured-rock well is unavailable.

The deuterium is indicative of ground water that originated (that is, was recharged) in a relatively cold, probably high altitude environment, much higher than the any of the mountain areas that surround the Tule Desert including the Clover Mountains (CH2M HILL, 2002).

Chloride concentrations in ground water typically only increase as ground water gains chloride ions from the fractured rock through which it flows. Carbonate rocks, however, are typically low in chloride and would not provide a source of chloride ions to ground water that flows through them. In addition, because chloride ions in ground water do not readily exchange with other anions in the rock, chloride concentrations in ground water typically do not decrease with distance along the path of flow. Accordingly, the low chloride concentrations in the vicinity of PW-1 and MW-4 is consistent with ground water that was recharged in a low chloride environment and stayed in such an environment (including carbonate and volcanic rocks) throughout its journey through the subsurface.

This combined (depleted deuterium/very low chloride) chemical signature is currently only known to exist in carbonate springs (Flat Nose, Delmues, and Bennet) in Dry Valley and Panaca Valley approximately 30 miles north of the northern edge of the Tule Desert hydrographic area. Ground water recharge to the Tule Desert must therefore involve southerly inter-basin ground water flow from Dry Valley through eastern Panaca Valley and eastern Clover Valley before entering the Tule Desert though faults and fractures in the subsurface volcanic rocks of the Clover Mountains.

In addition, the extremely low C-14 results (0.9 percent modern carbon) in PW-1, mentioned above, which is indicative of very old ground water, further support the premise that recharge to the fractured-rock aquifer in the Tule Desert occurred several miles north of the Tule Desert hydrographic area.

The data used to support these conclusions were obtained from Thomas et al. (2001) and Hydrosystems Inc. (2001), and are presented and analyzed in the *Water Resources Technical Report* (CH2M HILL, 2002).

Several conclusions about the ground water environment can be drawn based on the results of aquifer testing in the wellfield area, as described in the *Water Resources Technical Report* (CH2M HILL, 2002). The first conclusion is that the ability of the fractured-rock aquifer in the vicinity of PW-1 to transmit water (aquifer transmissivity) is relatively low. Specifically, the values of transmissivity for the fractured-rock aquifer obtained by pumping PW-1 were found to range between 14,500 and 27,000 gallons per day per foot of aquifer thickness (gal/day/ft).

Aquifer transmissivity, together with the magnitude of the horizontal component of hydraulic gradient, enables the amount of ground water flowing through the aquifer to be estimated by multiplying the product of these two parameters by a representative value of the width of the aquifer. Accordingly, using a representative value of transmissivity (14,500 gal/day/ft, which is the lowest value calculated), together with the observed hydraulic gradient (0.02), and an assumed minimum representative value for the width of the Tule Desert for which these parameters apply (20,000 feet or approximately 3.8 miles), the flow through this portion of the Tule Desert (that is, in the vicinity of PW-1) is roughly 6,500 afy (CH2M HILL, 2002).

Within the Tule Desert outside of this 4-mile wide width, the parameters in the aforementioned calculation are represented by other unknown values; consequently, ground water also flows within the Tule Desert fractured-rock aquifer outside and parallel to the 4-mile wide width selected for the calculation above. This additional amount (which would raise the total above 6,500 afy), however, cannot be reasonably calculated at this time.

In addition, significant additional ground water undoubtedly flows beneath the Tule Desert at depths deeper than that for which the transmissivity value obtained from PW-1 is representative and not included in the estimate above. PW-1 is approximately 1,800 feet deep (see Table 3-2) and additional unquantifiable amounts of ground water flows within deeper fractured-rock aquifer units (for example, deep Paleozoic carbonate rocks not encountered within the depths drilled to date) beneath the Tule Desert. This premise is supported by the existence of very deep (that is between 3,400 and

10,000 feet deep) wells that are reported to penetrate the regional Paleozoic carbonate aquifer system (Dettintger et al., 1995, Table 6).

The ability of the aquifer to store ground water (storativity) was also determined from the aquifer tests. Values of storativity, which is the volume of water pumped by a well, per foot of water-level decline, per unit area of the fractured-rock aquifer, have been calculated to range between approximately 0.005 and 0.012. Small values of this order of magnitude indicate that pumping results in very little loss of ground water from storage and confirms the observation that the ground water is confined under pressure within the fractures of the rock. Based on the value of 0.005 for aquifer storativity, the volume of ground water within the uppermost portion (that is, an aquifer thickness of no more than 1,000 feet) of the fractured-rock aquifer is estimated to be approximately 400,000 acre-feet (CH2M HILL, 2002).

The aquifer tests also revealed that water levels in the rock and overlying basin-fill deposits behave very similarly in response to pumping, although with much less water-level decline in the basin fill. As a result, it appears that there is significant hydraulic interconnection between the two aquifers, and that they effectively act as one unit at the scale of the wellfield area. In the vicinity of PW-1 and MW-4, the vertical component of hydraulic gradient is slightly upward, implying that ground water has a slight tendency to flow from the rock upward into the basin-fill deposits in this area.

Farther to the north and laterally upgradient, however, the vertical gradient is downward at MW-2. The downward gradient implies that ground water tends to flow from the basin-fill deposits into the fractured rock at this location. Therefore, although the results of aquifer testing indicate that ground water in the basin fill and ground water in the fractured-rock aquifer responds to pumping essentially as a unit, ground water in the two aquifers originates from different sources and flows differently, if not independently, through the Tule Desert.

Available water-chemistry data indicate that within the Tule Desert the ground water in the basin fill and ground water in the fractured-rock aquifer have different chemical compositions that reflect different origins. Specifically, ground water in the fractured rock in the vicinity of PW-1 and MW-4 is chemically similar to the regional carbonate-rock aquifer system (for example. highly depleted deuterium, very low chloride, very low C-14, and no detectable tritium (unstable isotope of hydrogen), which, if detected, is indicative of water less than 50 years old (tritium in precipitation originated with aboveground nuclear testing). Ground water in the basin-fill (based on data from the Tule Well and MW-5), however, is on the whole less depleted in deuterium, higher in chloride and has detectable tritium.

The results of the aquifer testing also provide insight into how much water individual wells can pump (well yield). Although PW-1 was found to sustain a pumping rate as high as 1,400 gpm for several days, the resulting water-level response indicates that long-term sustained rates of more than approximately 550 gpm are not practical for PW-1. Because of the spatial variability (heterogeneity) of the fractured-rock aquifer, the long-term yield of other wells could be more or less than 550 gpm.

3.4.2.1.3 Springs. Numerous small springs discharge ground water both within and around the Tule Desert (see Map 3-6). Most of these springs are in the Clover Mountains, but a few are located in the Tule Springs Hills and the East Mormon Mountains. The discharges from these springs typically are very low (all are less than 1 gpm and most are half that rate) (Walker, 2002).

In addition, several springs of regional importance lie outside of the project area. These springs include: the Littlefield Springs (see *Section 3.3, Surface Water Hydrology*); the Muddy Springs, located in Moapa Valley approximately 20 miles west-southwest of the project area; and the series of springs that rim the Overton Arm of Lake Mead.

Using water-chemistry data, principally deuterium, the general origin of the water that discharges from a given spring can be identified (see CH2M HILL, 2002, Appendix A). The deuterium data from the springs within both the Tule Desert and the Virgin Valley hydrographic areas indicate that the springs are recharged by local precipitation and that the water likely travels a relatively short distance (on the order of a few miles or less) before discharging.

Specifically, higher values of deuterium (lower negative values) represent water that originated as precipitation at relatively lower elevations. The lowest elevation springs (for example, Gourd, Peach, Tule, Summit, Snow, Sam's Camp #4), are in the East Mormon Mountains and Tule Springs Hills, as well as the foothills of the Clover Mountains. These springs all have values of deuterium that range between -76.5 per mil (Peach Spring) and -83 per mil (Tule Spring) with most around -77 per mil.

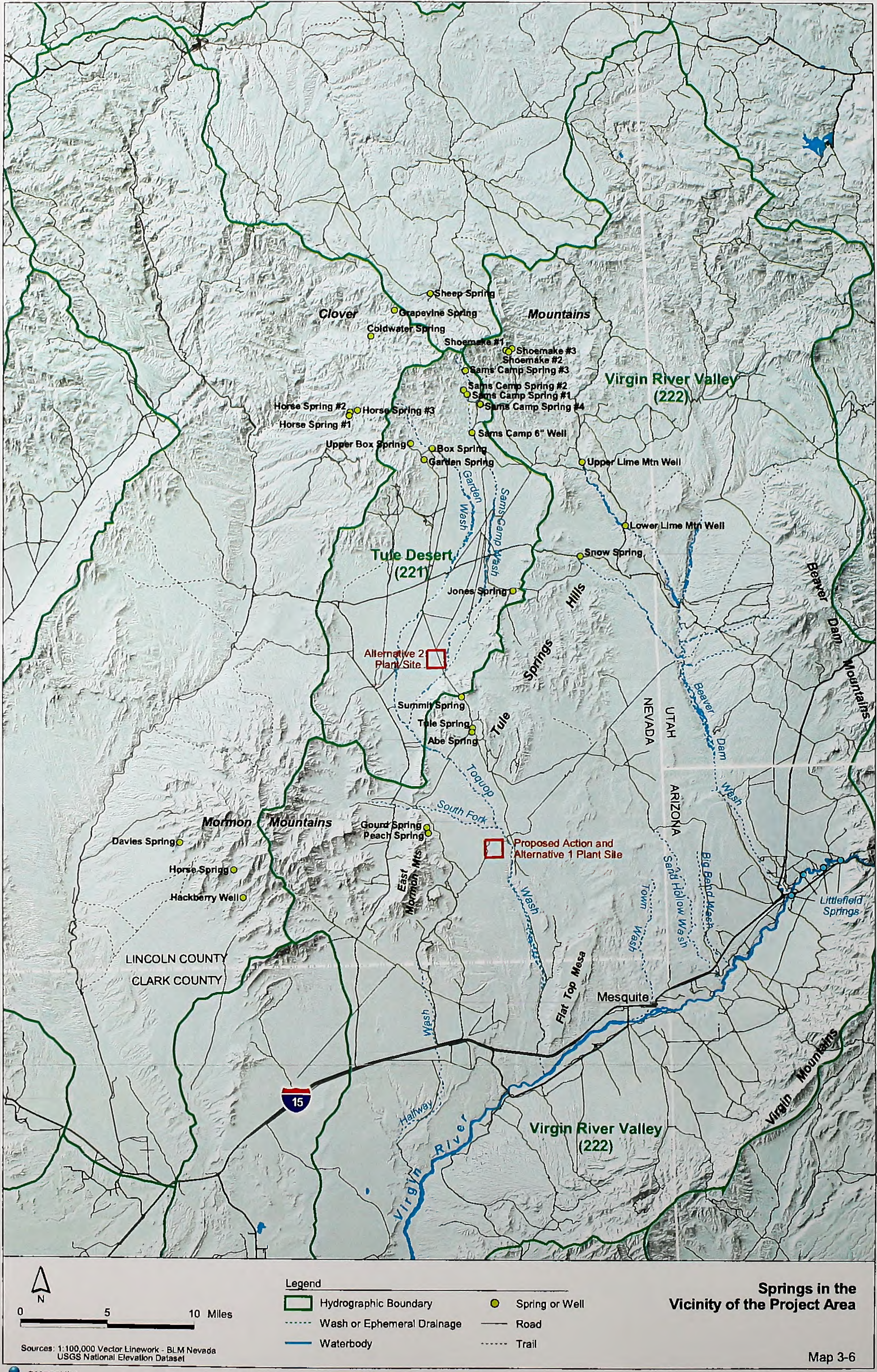
Springs in the Mormon and Clover Mountains are typically at higher elevations than the Tule Spring Hills (for example, Davies, Horse and Hackberry in the Mormon Mountains; Garden, Box, Upper Box, Sam's Camp #1, #2 and #3, Shoemake #1, #2 and #3, Sheep, and Mud Hole in the Clover Mountains), and have correspondingly lower (higher negative) values of deuterium relative to the springs at lower elevations (that is, the springs are more depleted in deuterium). Specifically, the deuterium values for these Clover and Mormon Mountain springs are all in a narrow band between -86 per mil and -88 per mil.

Both sets of these deuterium values (that is, the values from the lowest elevation springs and the higher elevation Mormon and Clover Mountain springs) contrast with values of deuterium on the order of -100 per mil that correspond to deep, regionally flowing ground water in the carbonate aquifer systems. Accordingly, local recharge is the source for all of the springs that are near the wellfield area (Peach, Gourd, Tule, and Summit springs).

This is consistent with the findings by Prudic et al. (1995), who state that many small springs in the local mountains typically represent perched local systems that are not connected to surrounding and underlying ground water. See the *Water Resources Technical Report* (CH2M HILL, 2002), for further discussion on the origin of the discharge of the local springs.

The origin of the water that discharges from some of the principal springs outside the project area is regional, but not related to the ground water in the fractured-rock within the Tule Desert. Specifically, the source of the Littlefield Springs is mainly a portion of the Virgin River that

H:\projects\toquop-water_toquop-eis.apr (Springs Layout)



Springs in the Vicinity of the Project Area

Map 3-6

Sources: 1:100,000 Vector Linework - BLM Nevada
USGS National Elevation Dataset

CH2MHILL

infiltrates through sinkholes upstream in Utah and emerges downstream at Littlefield (Trudeau et al., 1983). In addition, the available water chemistry data from the Littlefield Springs indicates that the spring discharge is chemically unrelated to the ground water in the fractured-rock aquifer within the Tule Desert. Specifically, relative to ground water from PW-1 and MW-4 in the Tule Desert, the Littlefield Springs are less depleted in deuterium, and contain significantly higher concentrations of chloride, sulfate, and total dissolved solids (TDS) relative to the test wells in the Tule Desert (see CH2M HILL, 2002).

The source of water to the Muddy Springs, 20 miles west-southwest of the project area, is from the regional carbonate-rock aquifer system recharged north of the Clover Mountains, but the discharge of these springs has no relation to the ground water in the Tule Desert. A comparison of the water chemistry of these springs with ground water from PW-1 and MW-4 in the Tule Desert indicates that the Muddy Springs are less depleted in deuterium, and contain considerably higher concentrations of chloride and TDS.

The water that discharges from springs around the Overton Arm of Lake Mead has been found to be of multiple origins, with most of the discharge resulting from local recharge (such as the discharge at Kelsey Spring) (Pohlmann et al., 1998). Rogers Spring, however, appears to have a regional carbonate-aquifer origin, but from sources that are not common with the fractured-rock aquifer of the Tule Desert (Pohlmann et al., 1998). Specifically, relative to ground water from PW-1 and MW-4 in the Tule Desert, the discharge from Rogers Spring is much less depleted in deuterium and is significantly higher in chloride and TDS.

3.4.2.2 Virgin River Valley Hydrogeology

3.4.2.2.1 Ground Water Occurrence. Much of the Virgin River Valley sits above a deep structural depression in which the underlying bedrock is as much as 6 miles deep below the valley floor (see *Section 3.2, Soils and Geology*). As a result, accessible ground water largely only occurs in the various deposits that comprise the basin-fill material within this hydrographic area.

The basin-fill principally consists of the Muddy Creek Formation, which is typically overlain by a veneer of Older Alluvium where alluvial fans and terraces abut against the local mountains and hills (Glancy and Van Denburgh, 1969; Metcalf, 1995). The Older Alluvium, which consists of the full range of sediments from silt and clay to gravel and boulders, generally thickens toward the center of the valley, and is essentially indistinguishable from the Muddy Creek Formation. Along the floodplain of the Virgin River, the river has cut through the Older Alluvium and deposited sediments commonly referred to as Younger Alluvium (Woessner et al., 1981, Glancy and Van Denburgh, 1969).

3.4.2.2.2 Ground Water Recharge and Flow. Ground water enters the Virgin River Valley from the north via the regional flow system described above that applies to the Tule Desert, and from areas to the east of the Tule Desert. Ground water also enters the Virgin River Valley from the east including recharge from Beaver Dam Wash and mountain-front recharge from the Beaver Dam and Virgin mountains (Las Vegas Valley Water District, 1992). In addition, ground water in the Virgin River Valley is also recharged directly by the Virgin River, and locally by residual irrigation water applied to crops in the Virgin River floodplain (see *Section 3.3, Surface Water Hydrology*). Once in the Virgin River Valley, the direction of ground water flow is generally toward the southwest parallel to the Virgin River (Las Vegas Valley Water District, 1992; Dixon and Katzer, 2002).

Conceptually, ground water flow from the Tule Desert into the Virgin River Valley occurs primarily through the fractured-rock aquifer because there is very little direct linkage between saturated portions of the basin-fill materials of each hydrographic area (that is, Toquop Gap, which is much less than 1 mile wide, is the only area where basin-fill sediments of each area merge). Ground water flows from the Tule Desert generally southward in the fractured-rock until the rock is truncated by the north edge of the Virgin River Depression (CH2M HILL, 2002). At that point ground water discharges into the basin-fill (Muddy Creek and underlying unconsolidated or semi-consolidated formations) of the Virgin River Depression. Once in the basin-fill aquifer system of the Virgin River Valley, ground water flows southwest, parallel to the Virgin River, toward the Overton Arm of Lake Mead (Las Vegas Valley Water District, 1992; Dixon and Katzer, 2002).

The published literature contains a range of estimates of the amount of ground inflow, including ground water recharge, to the Virgin River Valley. These estimates vary based on the assumptions and the data available to the authors. Glancy and Van Denburgh (1969) roughly estimated the combined inflow and recharge to be approximately 6,700 afy. Prudic et al. (1995), using the USGS computer models of ground water flow through the regional carbonate aquifer system, estimated the flow to be approximately 14,000 afy. The computer-derived estimate, however, is based on very general assumptions for conditions. At the time of that analysis, for example, there were no available data from the Tule Desert. Recently, Dixon and Katzer (2002), have performed a comprehensive water-budget analysis on the Virgin River Valley and have concluded that the total recharge to the Virgin River ground water system is on the order of 85,000 afy.

3.4.2.2.3 Aquifer Characteristics. The transmissivity of the Muddy Creek Formation in the Virgin River Valley is reported to be relatively low with values typically less than 10,000 gal/day/ft (Johnson, 2000). Higher transmissivity areas within the Muddy Creek Formation have been discovered where faulting has reportedly facilitated the development of potential localized conduits between the Muddy Creek Formation and the underlying fractured rock (Johnson, 2000).

The total volume of ground water in storage within the uppermost 100 feet of saturated sediments in the Nevada portion of the Virgin River Valley has been reported by Las Vegas Valley Water District (1992) to be approximately 2.9 million acre feet, based on a specific yield of 10 percent.

Dixon and Katzer (2002) estimate that the available perennial yield of the basin-fill aquifer system in the Virgin River Valley is approximately 40,000 afy, after estimates of the current level of pumping (12,000 afy) are taken into account. The perennial yield of a ground water basin is commonly defined as the rate at which water can be withdrawn perennially without producing an undesirable effect (Todd, 1980).

3.4.2.2.4 Virgin River/Ground Water Interaction. The Virgin River is essentially a "losing" river within the project area (see *Section 3.3.1.3, Surface Water Features*), which means that water from the river infiltrates the subsurface and recharges ground water. This conclusion is based on: 1) observed reductions in river flow in the downstream direction reported by Glancy and Van Denburgh (1969), Woessner (1981), and Metcalf (1995); 2) lower water levels for ground water relative to the elevation of the river, reported in Las Vegas Valley Water District (1992); 3) water-chemistry data indicating that the ground water in the Younger Alluvium immediately adjacent to the river is similar chemically to the Virgin River, but dissimilar to ground water in other basin-fill deposits (Older Alluvium and Muddy Creek Formation) (Metcalf, 1995); and 4) water-chemistry data indicating that the Virgin River downstream of Littlefield is composed exclusively of flows from Beaver Dam Wash, Littlefield Springs, and upstream (Utah) Virgin River flow.

The evidence that the local and regional ground water systems in the Virgin River Valley do not flow into the Virgin River is specifically addressed in CH2M HILL (2002).

3.4.2.3 Ground Water Quality

3.4.2.3.1 Tule Desert. Based on water samples from the wells in the vicinity of the wellfield, the water quality of the basin-fill deposits appears to be generally very good. This conclusion, however, is based on data from only two wells that are screened exclusively in the basin-fill deposits. The concentration of total dissolved solids (TDS) provides a general indication of water quality. TDS concentrations from MW-5 and the Tule Well are 320 and approximately 200 milligrams per liter (mg/L), respectively, which represents very good quality water. Based on samples from the Tule Well, the general character of the ground water in the basin-fill deposits is calcium-sodium sulfate.

The database on the quality of water in the fractured rock is also quite limited. TDS values from PW-1 and MW-4 are approximately 520 and 500 mg/L, respectively. These data are representative of good quality water, but not quite as good as the ground water in the overlying basin-fill. The general character of the ground water in the fractured rock is sodium sulfate, based on the chemical data from PW-1 (CH2M HILL, 2002).

In addition to the generally lower values of TDS in the basin-fill ground water relative to the fractured-rock ground water, other differences in the chemistry and water quality between these two aquifers are indicative of the separate nature of these aquifers—despite their tendency to act hydraulically as a single unit in response to pumping. Specifically, when compared with the basin-fill aquifer, the values in the fractured-rock aquifer are: 1) significantly lower with respect to chloride; 2) significantly higher with respect to silica; and 3) significantly lower with respect to deuterium.

3.4.2.3.2 Virgin River Valley. Based on water-quality data described in Glancy and Van Denburgh (1969), Metcalf (1995), and Las Vegas Valley Water District (1992), the general character of the ground water in the floodplain of the Virgin River tends to be mixed cation (sodium, potassium, magnesium), sulfate type water. Ground water from wells above the floodplain tends to have a composition of predominantly sodium sulfate plus chloride. The concentrations of TDS in wells along the river are very high with values ranging from approximately 2,100 mg/L to over 3,000 mg/L, indicating relatively poor-quality water. The TDS concentrations in wells above the floodplain are generally much lower—on the order of around 400 mg/L to 620 mg/L. Some of these wells above the floodplain, however, have TDS values that approach 2,000 mg/L.

Wells operated by the Virgin Valley Water District that penetrate the Muddy Creek Formation have had problems in the past producing water that meets drinking-water standards, but the water quality tends to improve in the immediate vicinity of faulted areas (Johnson, 2000).

3.4.2.4 Ground Water Use

3.4.2.4.1 Tule Desert. The basin-fill deposits in the Tule Desert are not extensively developed for water supply. Only one well that taps ground water in the basin-fill is known to exist within the Tule Desert. This well, known as the Tule Well (Map 3-5 in CH2M HILL [2002]), supports seasonal livestock grazing. In addition, some springs in the Tule Desert hydrographic area, particularly in the Clover Mountains, have been tapped to provide stock water (for example, Sam's Camp No. 1, 2, and 3).

Ground water in the fractured-rock aquifer within the Tule Desert has not been developed.

3.4.2.4.2 Virgin River Valley. The basin-fill deposits, principally the Muddy Creek Formation, in the Virgin River Valley have been developed to supply both potable water to the communities of Mesquite and Bunkerville, and to provide water for irrigation along the Virgin River. Currently, the Virgin Valley Water District maintains wells in the Virgin River Valley (Map 3-5) from which approximately 4,000 acre-feet are pumped annually. Within the Arizona portion of the Virgin River Valley, ground water pumping for primarily agricultural use is reported currently to be approximately 8,000 afy (Dixon and Katzer, 2002). The current total ground water withdrawal from the Virgin River Valley hydrographic area is therefore approximately 12,000 afy.

In addition, springs along the eastern flanks of the East Mormon Mountains and Tule Springs Hills have been tapped to provide stock water (Tule, Gourd, and Snow Water springs).

Because of the tremendous depths to the underlying carbonate rocks within the Virgin River Valley, this source of ground water has not been developed.

3.4.3 Pah Rah Parcel

Ground water has not been developed or studied at the Pah Rah parcel. As a result, while ground water is undoubtedly present within the fractured volcanic rocks that underlie the parcel, the specific nature of the ground water resources are unknown. No wells or springs are present on the parcel.

3.5 Biological Resources

3.5.1 Threatened, Endangered, Candidate, and Sensitive Species

3.5.1.1 Toquop Area

The U.S. Fish and Wildlife Service (FWS) provided a list that identified federal- and state-listed plant and wildlife species that are protected, sensitive, or species of concern potentially occurring in the project area. *Appendix D* contains official correspondence from the FWS identifying listed species, candidate species, and species of concern that may occur within the vicinity of the proposed Toquop Energy Project. One federally listed species was identified as occurring in the project area: the threatened desert tortoise (*Gopherus agassizzi*). Federally protected species associated with the Virgin River that were identified by the FWS were considered in assessing the potential for impact by the project as a result of ground water pumping. Those species are the endangered southwestern willow flycatcher (*Empidonax traillii extimus*), Yuma clapper rail (*Rallus longirostris yumanensis*), woundfin (*Plagopterus argentissimus*), Virgin River chub (*Gila seminuda*), and the candidate yellow-billed cuckoo, Western Distinct Population Segment (*Coccyzus americanus*).

3.5.1.1.1 Desert Tortoise. The project area is located within desert tortoise habitat. The area south and east of this area is the Mormon Mesa Area of Critical Environmental Concern (ACEC) for desert tortoise habitat (BLM, 2000). The southern plant site is also adjacent to two FWS-designated desert tortoise critical habitat units: Mormon Mesa Unit to the south and the Beaver Dam Slope Unit to the east (FWS, 1994). Maps 3-7, 3-8, and 3-9 show desert tortoise habitat and critical habitat in relation to features of the Proposed Action, Alternative 1, and Alternative 2, respectively.

Activity patterns of the desert tortoise are closely related to ambient temperatures and forage availability. Desert tortoises spend much of their lives in burrows, emerging to feed and mate during late winter and early spring. They remain active through the spring and portions of the summer through late fall. Their active season is typically defined as being from March 1 through October 31.

Threats to this species include direct and indirect human-caused mortality. Impacts such as destruction, degradation, and fragmentation of their habitat from urbanization, agricultural development, livestock grazing, mining, roads, vehicle-oriented recreational use, and losses from human take and disease have contributed to population declines (FWS, 1994).

Based on past surveys in the project area using the strip transect method, the project area supports a low-density desert tortoise population. Strip transects walked by Karl (1980) in and adjacent to the project area indicated tortoise population densities were very low (less than 10 tortoises per square mile). Strip transects walked in 1990 in the current right-of-way of the Kern River Gas Pipeline also recorded low sign counts with corresponding estimates of low densities of tortoises in the Toquop Wash area of the proposed project. Estimated densities were in the low range (10 to 45 tortoises per square mile) between mileposts 420 and 423 and in the very low range (zero to 10 tortoises per square mile) between mileposts 423 and 424 (Dames & Moore, 1990a).

The Sand Hollow permanent study plot is located approximately 5 to 6 miles east of the project area. Two samples of this study plot indicated a low density of desert tortoise. The plot was sampled in 1989 and again in 1994 with estimates of 8 and 15 tortoises per square mile, respectively (National Biological Service, 1995). Based on all data collection efforts in the project area, a reasonable estimate of desert tortoise density is approximately

11 tortoises per square mile. Project features and rights-of-way associated with the Proposed Action and Alternative 1 would be located on approximately 449 acres and 451 acres of desert tortoise habitat, respectively, while Alternative 2 features and rights-of-way would be located on approximately 581 acres of desert tortoise habitat.

3.5.1.1.2 Southwestern Willow Flycatcher. The southwestern willow flycatcher is a federally listed endangered species. It is a small bird with a grayish-green back and wings, whitish throat, light grey-olive breast, and pale yellowish belly. The breeding range of the southwestern willow flycatcher includes Arizona, southern California, New Mexico, the extreme southern parts of Utah and Nevada, southwestern Texas, and extreme northwestern Mexico. The habitat of this species includes riparian habitats along rivers, streams, or other wetlands with a dense growth of willows (*Salicaceae*), arrowweed (*Pluchea sevicea*), and tamarisk (*Tamaricaceae*), often with a scattered overstory of cottonwood (*Salicaceae populus*) (FWS, 1995). Breeding usually occurs in swampy thickets with willow and buttonbrush (American Ornithologists Union, 1983). During migration, southwestern willow flycatchers use a variety of habitats and may be encountered in all but the most sparse, desert habitats. These habitats do not exist on any of the project feature sites.

3.5.1.1.3 Yuma Clapper Rail. The Yuma clapper rail is listed by the federal government as an endangered bird species. Its preferred habitat is sedimented, shallow water cattail (*Typha latifolia*) and bulrush (*Scirpus acutus*) marshes. The Yuma clapper rail nests primarily in freshwater marshes in mature cattail-bulrush habitat. Nests are commonly found at or near the water's edge. Stands of cattail and bulrush dissected by narrow stream channels apparently support the densest populations of Yuma clapper rails. The closest potential habitat is on the Virgin River.

3.5.1.1.4 Woundfin. The historical range of the woundfin, an endangered fish species, included the Salt, Verde, and Gila rivers in Arizona; the lower Colorado River; and the Virgin River in Utah and Nevada. This species has been extirpated from most of its historical range except for the Virgin River. Presently, the woundfin's range in the Virgin River extends from La Verkin Springs in Utah downstream to Lake Mead (Virgin River Fishes Recovery Team, 1985). Woundfin also occur in the lower portions of La Verkin Creek in Utah, which is a tributary to the Virgin River. Critical habitat has been designated for this species in the Virgin River and its 100-year floodplain from its confluence with La Verkin Creek in Utah downstream to Halfway Wash in Nevada.

3.5.1.1.5 Virgin River Chub. The Virgin River chub, an endangered fish species, historically occurred in the mainstem Virgin River from La Verken Springs, Utah, downstream to the confluence with the Colorado River in Nevada (Virgin River Fishes Recovery Team, 1985). The present distribution of this fish species includes the mainstem Virgin River from La Verkin Springs, Utah, downstream to near the Mesquite Diversion, Nevada. Another distinct population, which is isolated by Lake Mead, occurs in the middle and upper portions of the Muddy River in Nevada. Critical habitat has been designated for this species in the Virgin River and its 100-year floodplain from the confluence with La Verkin Creek in Utah

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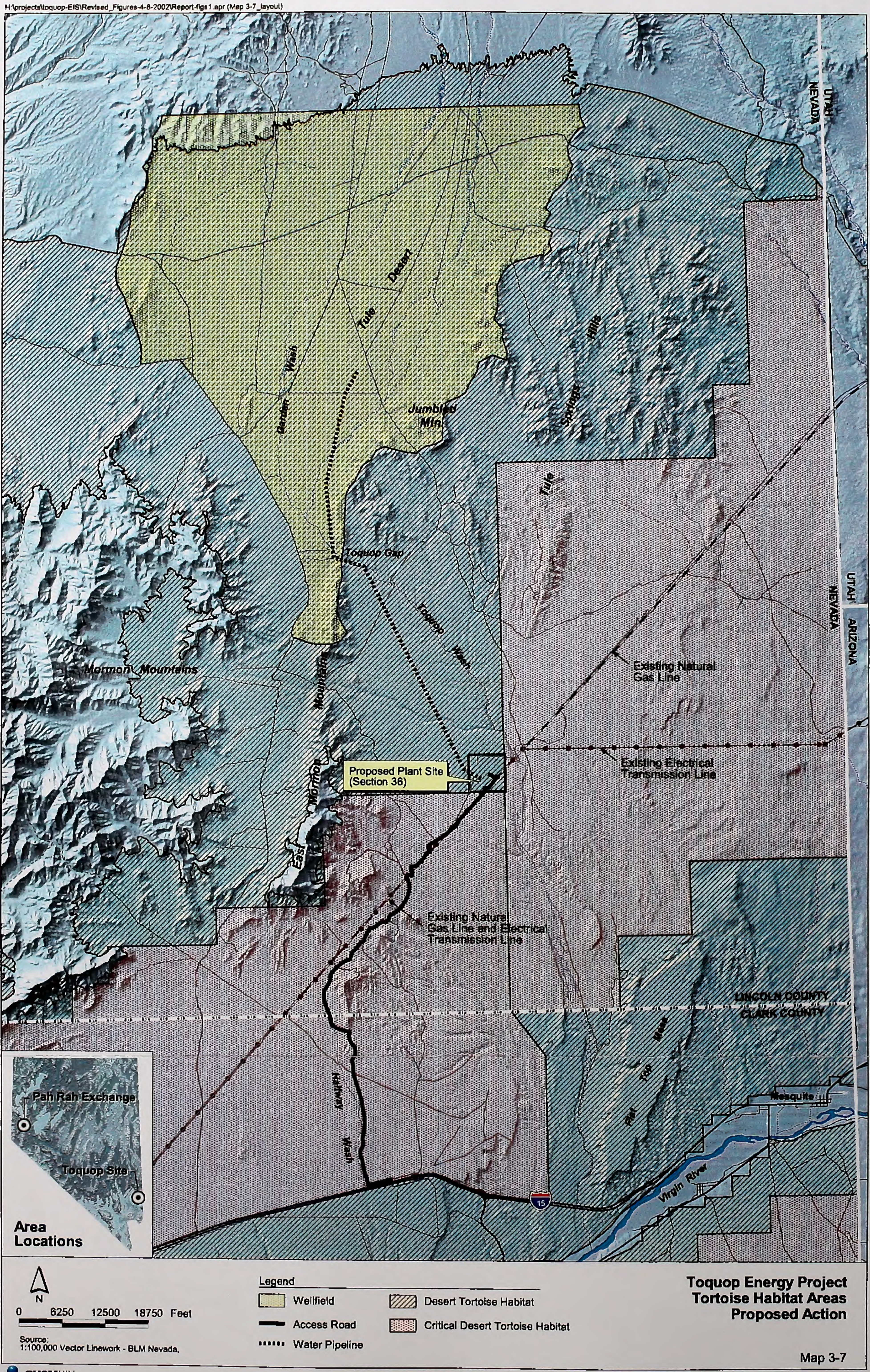

Source:
1:100,000 Vector Linework - BLM Nevada,

Toquop Energy Project
Tortoise Habitat Areas
Proposed Action

Map 3-7

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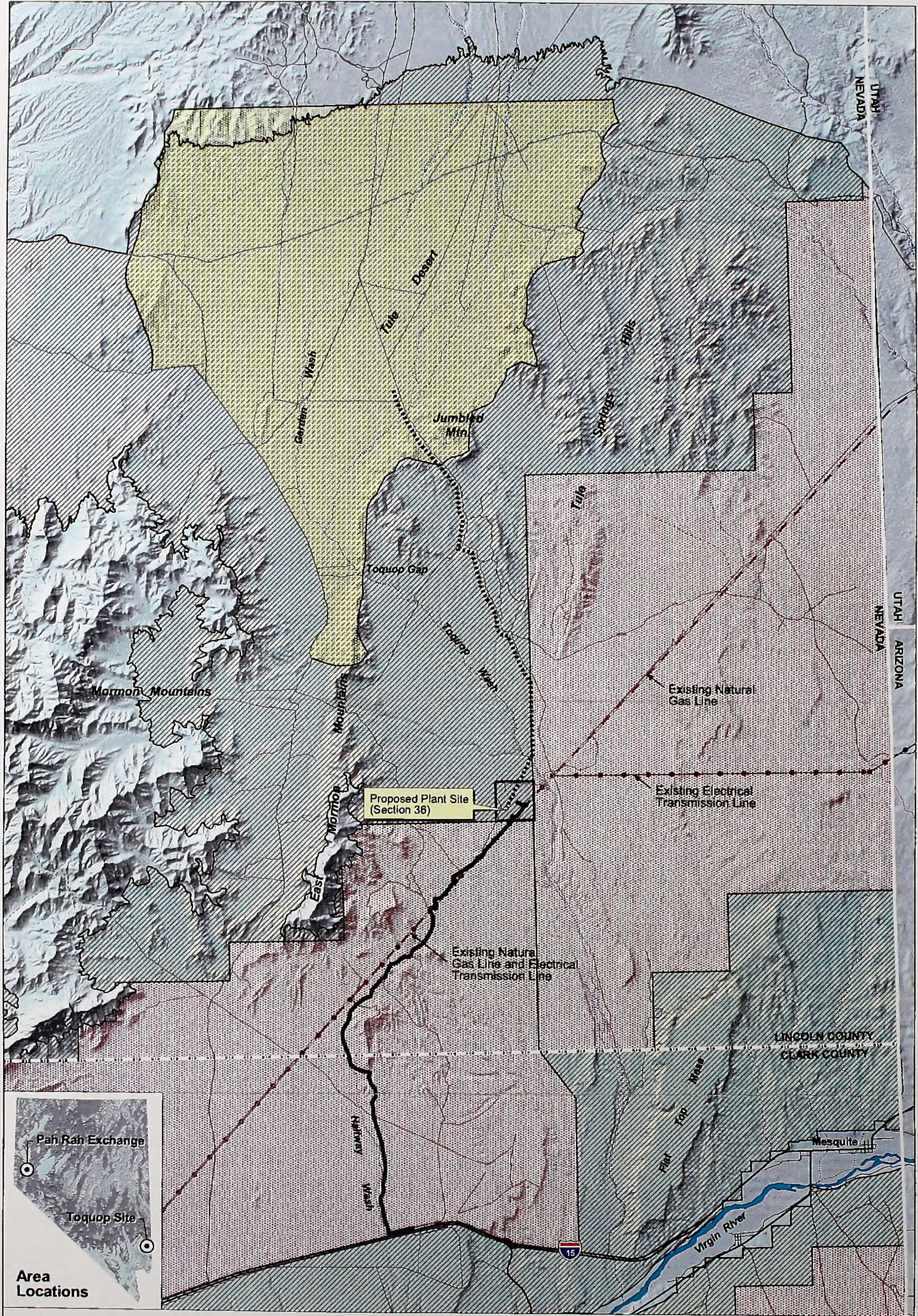

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Source:
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Legend

▨	Wellfield	▨	Desert Tortoise Habitat
━	Access Road	▨	Critical Desert Tortoise Habitat
┅	Water Pipeline		

Toquop Energy Project
Tortoise Habitat Areas
Alternative 1

Map 3-8

CH2MHILL

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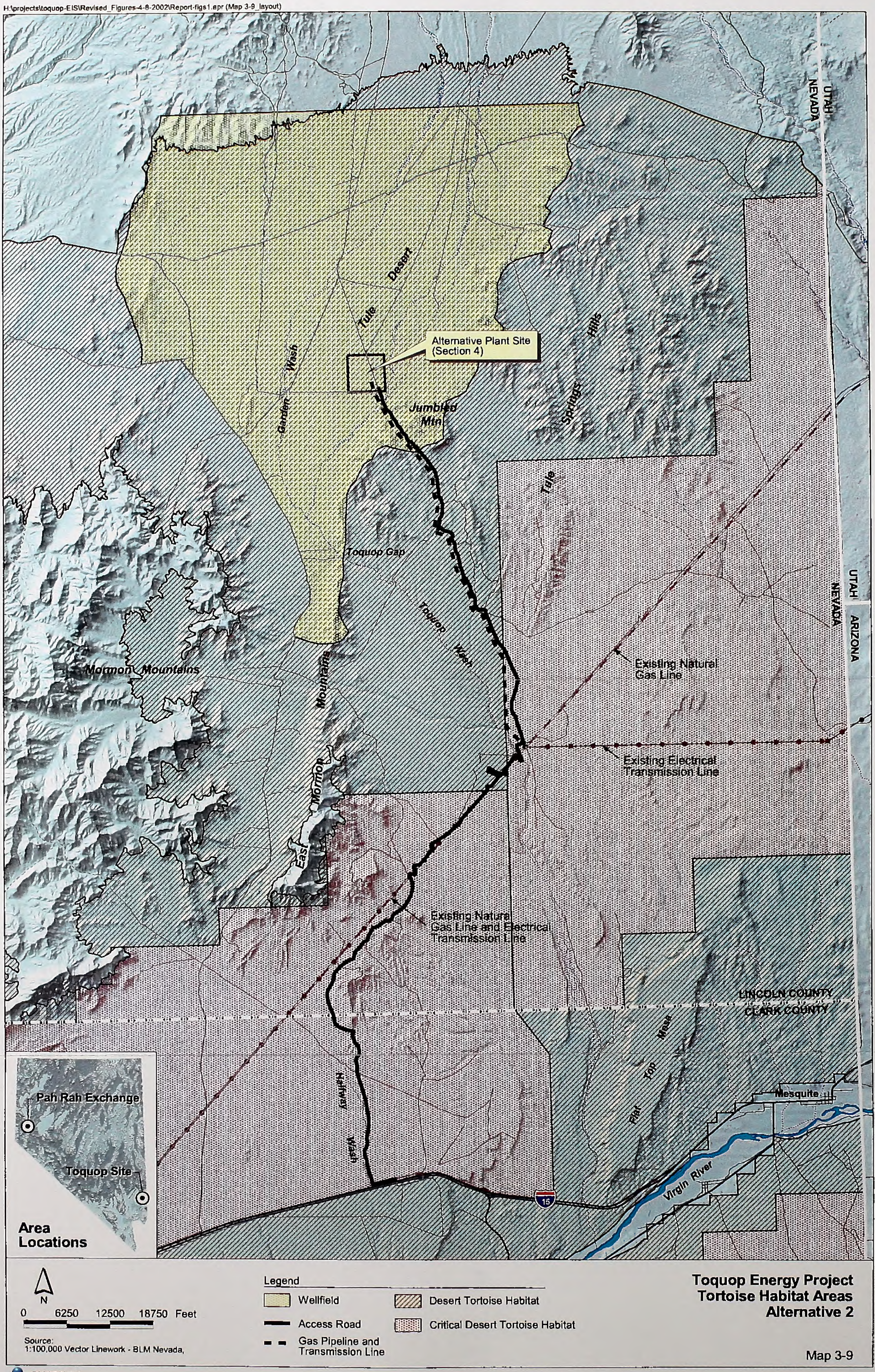

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Toquop Energy Project
Tortoise Habitat Areas
Alternative 2

Map 3-9

CH2MHILL

downstream to Halfway Wash in Nevada. This critical habitat designation is the same area as designated for the woundfin.

3.5.1.1.6 Candidate Species, Yellow-Billed Cuckoo. Yellow-billed cuckoo is a candidate for listing as threatened or endangered west of the Rocky Mountains. While this species is relatively common east of the Rocky Mountains, there is concern for loss or degradation of the species' riparian habitat in the West. Its breeding range formerly included most of North America from southern Canada to Mexico. Western yellow-billed cuckoos breed in large blocks of riparian habitats, particularly woodlands with cottonwoods and willows. Dense understory foliage appears to be an important habitat feature. The closest occupied habitat to the project area is the Virgin River (FWS, 2001).

3.5.1.1.7 Species of Concern and Other Sensitive Species. Table 3-3 lists species of concern identified during consultation with the FWS (2001) (see *Appendix D*) as potentially occurring within the vicinity of the project area. Banded Gila monsters (*Heloderma suspectum cinctum*) are protected from collection and killing under Nevada law (Nevada Revised Statute [NRS] 501.110). This species is more common in mountainous areas; however they could occur virtually anywhere in the project area.

TABLE 3-3
Species of Concern that may Occur Within the Vicinity of the Proposed Toquop Energy Project, Lincoln and Clark Counties, Nevada

Common Name	Scientific Name
Birds	
Western burrowing owl	*Athene cunicularia hypugea*
Black tern	*Chlidonias niger*
Blue grosbeak	*Guiraca caerulea*
American peregrine falcon	*Falco peregrinus anatum*
Least bittern	*Ixobrychus exilis hesperis*
Phainopepla	*Phainopepla nitens*
Summer tanager	*Piranga rubra*
White-faced ibis	*Plegadis chihi*
Vermilion flycatcher	*Pyrocephalus rubinus*
Lucy's warbler	*Vermivora luciae*
Arizona Bell's vireo	*Vireo bellii arizonae*
Fish	
Virgin spinedace	*Lepidomeda mollispinis mollispinis*
Mammals	
Spotted bat	*Euderma maculatum*
Greater western mastiff bat	*Eumops perotis californicus*

TABLE 3-3
Species of Concern that may Occur Within the Vicinity of the Proposed Toquop Energy Project, Lincoln and Clark Counties, Nevada

Common Name	Scientific Name
Allen's big-eared bat	*Idionycteris phyllotis*
California leaf-nosed bat	*Macrotus californicus*
Small-footed myotis	*Myotis ciliolabrum*
Long-eared myotis	*Myotis evotis*
Fringed myotis	*Myotis thysanodes*
Long-legged myotis	*Myotis volans*
Yuma myotis	*Myotis yumanensis*
Big free-tailed bat	*Nyctinomops macrotis*
Pale Townsend's big-eared bat	*Corynorhinus townsendii pallescens*
Amphibians	
Arizona southwestern toad	*Bufo microscaphus microscaphus*
Relict leopard frog	*Rana onca*
Reptiles	
Banded Gila monster	*Heloderma suspectum cinctum*
Chuckwalla	*Sauromalus obesus*
Plants	
Threecorner milkvetch	*Astragalus geyeri* var. *triquetrus*
Sticky buckwheat	*Eriogonum viscidulum*
Beaver Dam scurfpea	*Pediomelum castoreum*

*Species list provided by FWS (2001) (see *Appendix D*).

Although not formally protected by federal law, the chuckwalla (*Sauromalus obesus*) is considered rare and protected by the Nevada Department of Wildlife (NDOW) and as a special status (sensitive) species by the BLM. Chuckwalla habitat in the project area is rocky outcrops (including exposed caliche strata) and/or heavily bouldered terrain.

Like the woundfin and Virgin River chub, the Virgin spinedace (*Lepidomeda mollispinis mollispinis*)—another fish species—is dependent on aquatic habitats of the Virgin River.

With the exception of domestic pigeons (*Columbina passerina*), house sparrows (*Passer domesticus*), and European starlings (*Sturnus vulgaris*), all birds in the project vicinity are protected under the Migratory Bird Treaty Act of 1918 (MBTA), as amended (16 United States Code [U.S.C.] 703-712). Suitable habitat for the burrowing owl (*Athene cunicularia hypugea*) occurs throughout the project area. Because burrowing owls are year-round residents in the area, the potential for impact is high. Burrowing owls are often found in the same habitat as desert tortoises because they utilize abandoned desert tortoise burrows. The burrowing owl is protected under the MBTA, which states that it is unlawful to take, kill, or possess migratory birds (16 U.S.C. 703-711). Potential for impacts on migratory birds is primarily a concern during the breeding season, which occurs during the spring and summer for burrowing owls. Other bird species of concern listed in Table 3-3, as well as the yellow-billed cuckoo *(Coccyzus americanus)* which is a FWS candidate species, are found in the region and have the potential to pass through the project area as migrants or occasional visitors.

Many types of bats that could potentially occur in the project area are also considered species of concern by the FWS. These bat species are identified in Table 3-3. All but four of the bat species listed in Table 3-3 are considered sensitive species by the BLM. The four that are not listed are the greater western mastiff bat, fringed myotis, long-legged myotis, and Yuma myotis (BLM, 1999). Although such habitats are unusual, certain naturally occurring caves and even some abandoned mines, can provide the necessary temperature regimes for bats. The continued presence of such features is critical to maintaining some local bat populations; however, no specific sites like these have been identified at project feature sites.

Three plant species of concern listed in Table 3-3 were identified for field surveys as a result of a species list requested from the FWS. Subsequently, information regarding these species' habitats and blooming times was reviewed as a part of these biological studies. Field surveys were conducted at the southern Toquop power plant site on April 17, 2001, for beaver dam scurfpea (*Pediomelum castoreum*) and threecorner milkvetch (*Astragalus geyeri* var. *triquetrus*), and on May 16, 2001, for sticky buckwheat (*Eriogonum viscidulum*). This second survey was necessary because sticky buckwheat flowers approximately 3 to 4 weeks later than the milkvetch species. The surveys conducted were timely for the species occurrence and extensive. However, no sensitive species were located. It is unlikely that these species occur within the project area.

3.5.1.2 Pah Rah Parcel

The Pah Rah parcel has not been identified or proposed as significant or critical habitat for any wildlife species. Field reviews of the area for wildlife were conducted in April, May, and November 2001. During the field reviews, sage grouse (*Centrocercus urophasianus*) sign was common with possible lek areas observed in the central portion of the parcel. In addition, two sage grouse—a species of concern—were observed during the November field review.

Five BLM-sensitive plant species were identified for field surveys. The species are altered andesite buckwheat (*Eriogonum robustum*), Lemmon buckwheat (*Eriogonum lemmonii*), Webber ivesia (*Ivesia webberi*), Nevada oryctes (*Oryctes nevadensis*), and Nevada suncup (*Camissonia nevadensis*). Field reconnaissance on the Pah Rah parcel was conducted on May 15, 2001, and none of these plant species were identified.

3.5.2 Native Vegetation, Invasive Species, and Noxious Weeds

3.5.2.1 Toquop Area

The Toquop area lies within the Mojave Desert biome. Vegetation communities within this biome and represented at the Toquop area can be further characterized as southern desert shrub and northern desert shrub. The topography is characterized by high mountain ranges with intervening valleys and canyons featuring broad alluvial fans and bajadas. Climate of the Mojave Desert is typified by hot dry summers and cool dry winters with annual precipitation ranging between 4 and 12 inches. Southern desert shrubs generally occur between 1500 and 5000 feet in elevation. The vegetation in the Toquop area is representative of a more mesic portion of the Mojave Desert based upon the dominance/presence of black brush (*Coleogyne ramosissima*) on most sites and elevations mostly above 2100 feet.

Plants representative of the southern desert shrub community include creosote (*Larrea tridentata*), shadscale (*Atriplex confertifolia*), white bursage (*Ambrosia dumosa*), Joshua tree (*Yucca brevifolia*), Mojave yucca (*Yucca schidigera*), and Mormon tea (*Ephedra nevadensis*). Associated species include range ratany (*Krameria parvifolia*), desert trumpet (*Eriogonum inflatum*), big galleta (*Hilaria rigida*), Indian ricegrass (*Oryzopsis hymenoides*), and spiny hopsage (*Grayia spinosa*). The northern desert shrub plant community is characterized by black brush, creosote, yuccas, bursage, rabbit brush (*Chrysothamnus* spp.), snake weed (*Gutierrezia* spp.), big galleta, Indian ricegrass, and sand dropseed (*Sporobolus cryptandus*). Cactus species such as beavertail (*Opuntia basilaris*), staghorn cholla (*Opuntia acanthocarpa*), hedgehog (*Echinocereus engelmannii*), and barrel cactus (*Ferocactus wislizenii*) are present throughout the project site. The following species are common in all portions of the Toquop area: Joshua trees (*Yucca brevifolia*), creosote bush (*Larrea tridentata*), white bursage (*Ambrosia dumosa*), Nevada ephedra, turpentine broom (*Rutaceae Thomnosina*), white burrobush (*Ambrosia dumosa*), filaree (*Erodium cicutarium*), desert trumpet (*Eriogonum inflatum*), annual phacelia (*Phacelia*), fiddleneck (*Amsinckia*), and red brome (*Bromus*). Exceptions are the gypsiferous soils located just north of the Toquop Wash and the active wash channels that support distinctive vegetation. Additional species found in the wash include desert willow (*Bignoniaceae chiliopsis*), western mugwort (*Artemisia ludoviciana*), desert poppy (*Papaveraceae Arctomecon*), sweet clover (*Crossosomataceae melilotus*), robust fourwing saltbush (*Atriplex canescens*), rabbit brush (*Chrysothamnus* spp.), Mojave aster (*Machaeranthea tortifolia*), and desert needlegrass (*Stipa speciosa*). Salt cedar (*Tamarix ramosissima*), a noxious weed, is present in the Toquop Gap. The entire project area supports various cacti species, yuccas, and Joshua trees. All species in the cactus family (Cactaceae) and members of the genus *Yucca* and *Agave* are protected by Nevada State Law (NRS 527.060-.120).

All drainages along the roads were observed to support rabbit brush, fourwinged saltbrush (*Atriplex canesceus*), and an annual lupine (*Lupinus*). These species were unique to the drainages. The introduced winter annual filaree (*Erodium cicutarium*) dominated the interspaces between shrub species on all the sites surveyed with the exception of the washes.

The washes contained annual lupine, popcorn flower (*Plagiobothrys* spp.), small flowered blazing star (*Mentzelia minutiflora*), and bladder sage (*Labiatae salazaria*). Indian paintbrush (*Collinsia Catillega*) grew under protective shrubs along with isolated occurrences of desert larkspur (*Loasaceae mentzelia*).

Within the project area four genera of invasive, non-native plant species have been observed. The most common are annual grasses in the genus *Shismus,* commonly known as Mediterranean grass, and *Bromus*. In some areas these two genera have been reported to account for up to 100 percent of the ground cover. Prevalence of these grasses is greatly dependent on rainfall and temperature. Both thrive on disturbed soils. In some areas Russian thistle (*Salsola iberica)* and tamarisk (*Tamarix ramosissima*) are common. Tamarisk is on the Ely District Weed List; and red brome (*Bromus rubens*), cheatgrass (*Bromus tectorum*), and Russian thistle have been identified as injurious plants within the Ely District (BLM, 1999; FERC and CSLC, 2002). Thirteen species of noxious weeds on the on the Nevada State Weed List have been identified as occurring the Ely District (BLM 1999). However, none of these species were observed in the Project Area during field surveys and they have not been reported as occurring in the area in any documents reviewed for the project. All these invasive, non-native plants, except Mediterranean grass, are considered noxious weeds by the BLM (1999).

3.5.2.2 Pah Rah Parcel

Vegetation within the subject property is typical of the Great Basin Desert. Shrub vegetation is fairly uniform throughout the area. Shrubs include bud sage (*Artemisia spinescens*), spiny hop sage (*Grayia spinosa*), big sage (*Artemisia tridentata*), fourwinged saltbrush (*Atriplex canesceus*), and green rabbit brush (*Chrysothamnus* spp.). Flowering plants identified during surveys include phlox (*Plemoniaceae Phlox*), Indian paintbrush, and bitterroot (*Lewisia rediviva*). Lichens are abundant on rocky surfaces. Temperatures typically vary from approximately 40°F in winter to 100°F in summer. Average annual precipitation (in Washoe County) varies from approximately 4 to 16 inches. The majority of the section is relatively flat. The highest elevation is 6253 feet (along the western boundary), and the lowest elevation is 5299 feet.

Noxious weeds were not noted during the field reconnaissance in May. There are no records indicating the presence of noxious weeds on the parcel. Because of the remote nature of the parcel and the lack of roads, it is unlikely that noxious weeds are present.

3.5.3 Wild Horses and Burros

On December 15, 1971, Congress enacted the Wild and Free-Roaming Horse and Burro Act, authorizing the BLM to manage wild horses and burros on the public lands and mandating that wild and free-roaming horses and burros be protected from unauthorized capture, branding, harassment, or death. Those areas of public land that were used as habitat for wild horses and burros in 1971 were delineated as Herd Management Areas (HMA). The BLM's policy is to protect, manage, and control wild horses and burros on public lands.

3.5.3.1 Toquop Area

The proposed south Toquop parcel (plant site) is not within an identified HMA; however, the proposed wellfield/pipeline and adjacent north Toquop parcel (plant site) are located within two HMAs. The proposed wellfield enters the northeast portion of the Mormon Mountain HMA, which has an Appropriate Management Level (AML) set at zero for wild horses. The northern portion of the wellfield lies within the Blue Nose Peak HMA. The AML for the Blue Nose Peak HMA is currently being set through the Multiple Use Decision process. No wild horses or burros were observed during field surveys. Wild horses use the northern portion of the wellfield at various times of the year to utilize existing livestock water improvements.

3.5.3.2 Pah Rah Parcel

The Pah Rah parcel is located in a Herd Area for wild horses and burrows and is managed by BLM as a "horse free" area because these animals are not compatible with the increased development in the area. No wild horses or burros were observed during the spring field reconnaissance surveys.

3.5.4 Wildlife and Fisheries Resources

3.5.4.1 Toquop Area

The parcel supports a diversity of wildlife species common to the desert habitats. Numerous previously identified reptile, rodent, bird, and small mammal species inhabit or utilize this parcel. The desert tortoise, a federally listed species, is known to occupy this parcel. The parcel does not support a dense population of desert tortoise.

A wide variety of terrestrial species presently occupies and/or otherwise uses the project area. Fish are absent from the project area because of the lack of suitable aquatic environments.

3.5.4.1.1 Amphibians. Amphibian species potentially occurring within the area include the Great Basin spadefoot *(Scaphiopus intermountonus)*, western toad (*Bufo boreas*), red-spotted toad *(Bufo punctatus)*, Great Plains toad (*Bufo cognatus*), Pacific tree frog (*Hyla regilla*), and the leopard frog (*Rana pipiens*). These highly desert-adapted species occur throughout the Mojave Desert region. The somewhat less-desert-adapted Woodhouse's toad (*Bufo woodhousei*) might also be expected within moist areas.

3.5.4.1.2 Reptiles. A wide variety of reptile species occupies the project area. Southern Nevada deserts support at least 16 lizard species, many of which occupy the Toquop area. These include side-blotched lizard (*Uta stansburiana*), western whiptail (*Cnemidophorus tigris*), zebra-tailed brush lizard (*Urasourus graciosus*), desert horned lizard (*Phrynosoma platyrhinos*), desert iguana (*Dipsosaurus dorsalis*), chuckwalla *(Sauromalus obesus)*, long-nosed leopard lizard (*Gambelia wislizenii*), desert collared lizard (*Crotaphytus insularis*), banded gecko (*Coleonyx variegatus*), and Gila monster.

Eighteen snake species occur locally and, as with the lizards, several can be found in the project area. These include western blind snake (*Leptotyphlops humilis*), ground snake (*Sonora semiannulata*), spotted leaf-nose snake (*Phyllorhynchus decurtatus*), red racer (*Masticophis* *flagellum*), patch-nosed snake (*Salvadora hexalepis*), gopher snake (*Pituophis melanoleucus*), glossy snake (*Arizona elegans*), long-nosed snake (*Rhinocheilus lecontei*), king snake (*Lampropeltis getulus*), night snake (*Hypsiglena torquata*), lyre snake (*Trimorphodon biscutatus*), sidewinder or horned rattlesnake (*Crotalus cerastes*), Mojave rattlesnake (*C. scutulatus*), and speckled rattlesnake (*C. mitchellii*).

3.5.4.1.3 Migratory Birds. A wide variety of avian species either occupies or migrates through the Toquop area. Some typical nesting species of local, open desert environments are the black-throated sparrow (*Amphispiza bilineata*), cactus wren (*Campylorhynchus brunneicapillus*), horned lark (*Eremophila alpestris*), greater road runner (*Geococcyx californianus*), ash-throated flycatcher (*Myiarchus cinerascens*), Say's phoebe (*Sayornis saya*), verdin (*Auriparus flaviceps*), loggerhead shrike (*lanius ludovicianus*), mourning dove (*Zenaida macroura*), and Gambel's quail (*Callipepla gambelii*).

In the more rugged upland and canyon locales, rock wren (*Salpinctes obsoletus*), raven (*Corvus corax*), barn owl (*Tyto alba*), great-horned owl (*Bubo virginianus*), prairie falcon (*Faleo mexicanus*), American kestrel (*Faleo sparverius*), red-tailed hawk (*Buteo jamaicensis*), golden eagle (*Aquila chrysaetos*), and turkey vulture (*Cathartes aura*) can also be considered as likely locally nesting species.

Virtually all migrant species using western flyways potentially pass through this area during their spring and fall migrations.

Gambel's quail habitat occurs throughout the entire project area. Higher concentrations of quail can be expected around the major washes, cattle stock tanks, and springs that occur on the proposed project plant and well sites, access roads, and utility corridors. Numerous coveys of quail were observed during surveys of the Toquop area.

3.5.4.1.4 Mammals. Several carnivores occupy the various habitats that occur throughout or near the project area. Bobcat (*Lynx rufus*), coyote (*Canis latrans*), kit fox (*Vulpes macrotis*), gray fox (*Urocyon cinereoargentus*), and badger (*Taxidea taxus*) might reasonably be encountered in suitable habitats along the various utility corridors. Mountain lion (*Felis concolor*) is a possible occupant of the Mormon Mountain uplands.

Various other mammals also inhabit the project area. Typical species include black-tailed jackrabbit (*Lepus californicus*), desert cottontail rabbit (*Sylvilagus audobonii*), desert wood rat (*Neotoma lepida*), white-tailed antelope ground squirrel (*Ammospermophilus leucurus*), round-tailed ground squirrel (*Citellus tereticaudus*), pocket gopher (*Thomomys bottae*), kangaroo rat (*Dipodomys* sp.), various cricetid mice (*Onychomys* sp., *Reithrodontomys megalotis, Peromyscus* sp.), and pocket mice (*Perognathus* sp.). Bighorn sheep (*Ovis canadensis nelsoni*) and mule deer (*Odocoileu hemionus*) are managed by NDOW (NRS 501) and occupy mountainous areas through which the various alignments pass along the East Mormon Mountains.

3.5.4.2 Pah Rah Parcel

The Pah Rah parcel supports a fairly monotypic vegetation community represented by a few annual and perennial plants previously described. The Pah Rah parcel is undisturbed habitat containing no roads and is accessible only by foot. The parcel is typical of other relatively undisturbed habitats at similar elevations in the surrounding area. The parcel contains a diversity of wildlife species common to this Great Basin community. Numerous reptile, bird, rodent, and other small mammals previously described inhabit or use this parcel. Large mammals such as pronghorn antelope have been frequently observed on the parcel. Mule deer are likely infrequent visitors. Moderate to high use of this parcel by sage grouse is an additional wildlife value.

Field reviews of the area were conducted in April, May, and November 2001. More than one dozen pronghorn antelope (*Antilocapra americana*) that have been seen previously were observed during the November field review.

3.5.4.2.1 Amphibians. The Great Basin spadefoot and western toad may occupy the Pah Rah parcel.

3.5.4.2.2 Reptiles. Several species of reptiles are known or expected to occur on the subject parcel. Lizard species include the zebra-tailed, leopard lizard, collared lizard, desert spiny (*Sceloperus magister*), western fence sagebrush lizard (*Sceloporus graciosus*), side-blotched, northern desert horned (*Phrynosoma platyrhiros*), western skink (*Eumeces kiltonianus*), and western whiptail (*Cnemidophorus tigris*). Snake species potentially occurring at the site include the rubber boa (*Charina bottae*), red racer, striped whipsnake (*Masticophus taeniatus*), western patch-nosed, gopher, California kingsnake, long-nosed snake, western garter snake (*Thamnophis elegans*), western ground snake, night snake, and the Great Basin rattlesnake (*Crotalus lutesus*).

3.5.4.2.3 Migratory Birds. A wide variety of bird species either occupies or migrates through the project area. Typical nesting species likely to use the site include: chukar (*Alectoris* sp.), morning dove, burrowing owl, western flycatcher (*Empidonax difficilis*), green-tailed towhee (*Pipilo chloruros*), house finch (*Carpodacus mexicanus*), western kingbird (*Tyrannus vociferans*), horned lark, rock wren, canyon wren (*Catherpes mexicanus*), sage thrasher (*Oreoscoptes montanus*), sage sparrow (*Amphispiza belli*), and black-throated sparrow.

3.5.4.2.4 Mammals. Several carnivores are expected to occupy or use the Pah Rah parcel. Bobcat, coyote, kit fox, and badger are likely to be present on this parcel. Mountain lions may occasionally utilize this area during hunting forays. Other common species present, or likely to be present, at this site include black-tailed jackrabbit, yellowbelly marmot (*Marmota flaviventris*), Townsend ground squirrel (*Citellus townsendi*), least chipmunk (*Eutamius minimus*), white-tailed antelope ground squirrel, northern pocket gopher, pocket mice, various cricetid mice, mountain cottontail (*Sylvilagus nuttalli*), mule deer, and pronghorn antelope.

3.5.5 Wetlands/Riparian Zones, Floodplains, and Waters of the United States

The identification of wetlands, rivers, and streams within the project area was based on review of the 1:24,000-scale U.S. Geological Survey (USGS) topographic maps and several field reconnaissance surveys conducted at the Toquop sites in November 2001. National Wetland Inventory (NWI) maps, which are prepared by the FWS, have not been prepared for the proposed sites. The identification of floodplains is based on the Federal Emergency Management Agency (FEMA) floodplain maps.

Areas inspected for the presence of ephemeral washes or other potential waters of the United States (such as wetlands or aquatic areas) included the proposed plant sites, well sites, access roads, and western and eastern pipeline/utility alignments. The delineation of areas potentially within U.S. Army Corps of Engineers (USACE) jurisdiction included those areas within the ordinary high water mark (OHWM). The proposed jurisdictional limits were delineated at the OHWM as identified by sediment lines, debris marks, or natural banks. The locations of the potential waters of the United States were recorded by a global positioning system (GPS) unit and marked on topographic maps of the project area.

3.5.5.1 Toquop Area

Numerous ephemeral washes convey runoff from the surrounding hillsides. The primary named ephemeral washes within the Toquop area are Halfway Wash, near I-15, between the Mormon Mountains and East Mormon Mountains; Toquop Wash and South Fork Toquop Wash, east of the East Mormon Mountains; Sam's Camp Wash, north and west of the Tule Springs Hills; and Garden Wash. These ephemeral washes are likely to be classified as waters of the United States and are subject to the requirements of Section 404 of the Clean Water Act (CWA).

Wetlands or other aquatic areas are found near springs in the Toquop area and along the Virgin River. These are shown on Map 3-6, in *Section 3.4, Ground Water Resources.*

According to the FEMA floodplain map (Map Index Community Panel Number 320014 0001-5525), the Toquop area is located in Zone D. Zone D is defined on the FEMA map as "areas of undetermined, but possible, flood hazards."

3.5.5.2 Pah Rah Parcel

Perennial water bodies and waters of the United States are not present within the Pah Rah parcel. No wetlands, other aquatic areas, or riparian vegetation are present within the Pah Rah parcel.

3.6 Air Quality and Noise

3.6.1 Air Quality

3.6.1.1 Toquop Area

3.6.1.1.1 Climate and Meteorology.

The locations of the Proposed Action and Alternatives 1 and 2 are in the southeast desert region of Nevada. Moderate to hot temperatures, low humidity, and minimal annual rainfall typify the region. The region actually has four well-defined seasons, although they differ from the traditional view of seasonal variation. Summers display classic southwest desert characteristics. Daily high temperatures typically exceed 100ºF with lows in the 70ºF range. The summer heat is tempered somewhat by the extremely low relative humidity. However, it is not uncommon for humidity to increase markedly for several weeks each summer in association with a moist monsoonal flow from the south, typically during July and August. Aside from increasing the discomfort level, these moist winds also support the development of spectacular desert thunderstorms, which are frequently associated with significant flash flooding and/or strong downburst winds.

Winters, on the whole, are mild. Afternoon temperatures average near 60ºF, and skies are mostly clear. Pacific storms occasionally produce rainfall in the southern Nevada desert, but in general, the Sierra Nevada Mountains of eastern California and the Spring Mountains immediately west of the Las Vegas Valley act as effective barriers to moisture. Snow accumulation is rare in the lower desert region. Flurries are observed once or twice during most winters, but snowfall of 1 inch or more occurs only once every 4 to 5 years. However, freezing temperatures do occur with some regularity. Based on the 1961 to 1990 period of record, the average first occurrence of 32ºF in the fall is November 25; the average last occurrence is February 28.

The spring and fall seasons are generally considered ideal. Although rather sharp temperature changes can occur during these months, outdoor activities are seldom hampered. Strong winds are arguably the most persistent and provoking weather hazard experienced in the area. Winds over 50 miles per hour (mph) are infrequent but can occur with some of the more vigorous storms. Winter and spring wind events often generate widespread areas of blowing dust and sand. Strong wind episodes in the summertime are usually connected with thunderstorms, and are thus more isolated and localized. Prevailing wind direction is typically southwesterly, unless associated with a thunderstorm outflow.

Surface winds are characterized by prevailing southwesterly winds with an average speed of approximately 10 mph. Wind speeds are lowest during the winter season with an average of approximately 8 mph. Spring is typically the windiest season with an average wind speed of approximately 12 mph. Figure 3-1 shows a wind rose for the Toquop area.

Figure 3-1 shows a wind rose for the Toquop area. The wind rose graphically depicts a plot of one year of hourly wind speed and vector recordings, from 1990, and should be representative of overall annual observations for any year. Wind data for the chart were taken from the National Weather Service station in Las Vegas (LAS), the nearest station with publicly available data.

Temperatures range from an average daily maximum of 60.2ºF in January to 105.5ºF in July. Average daily minimum temperatures range from 43.2ºF in January to 67.2ºF in July.

The region is one of the driest in the U.S., receiving an annual average precipitation of only 6.9 inches. Monthly precipitation ranges from 0.16 to 0.89 inch.

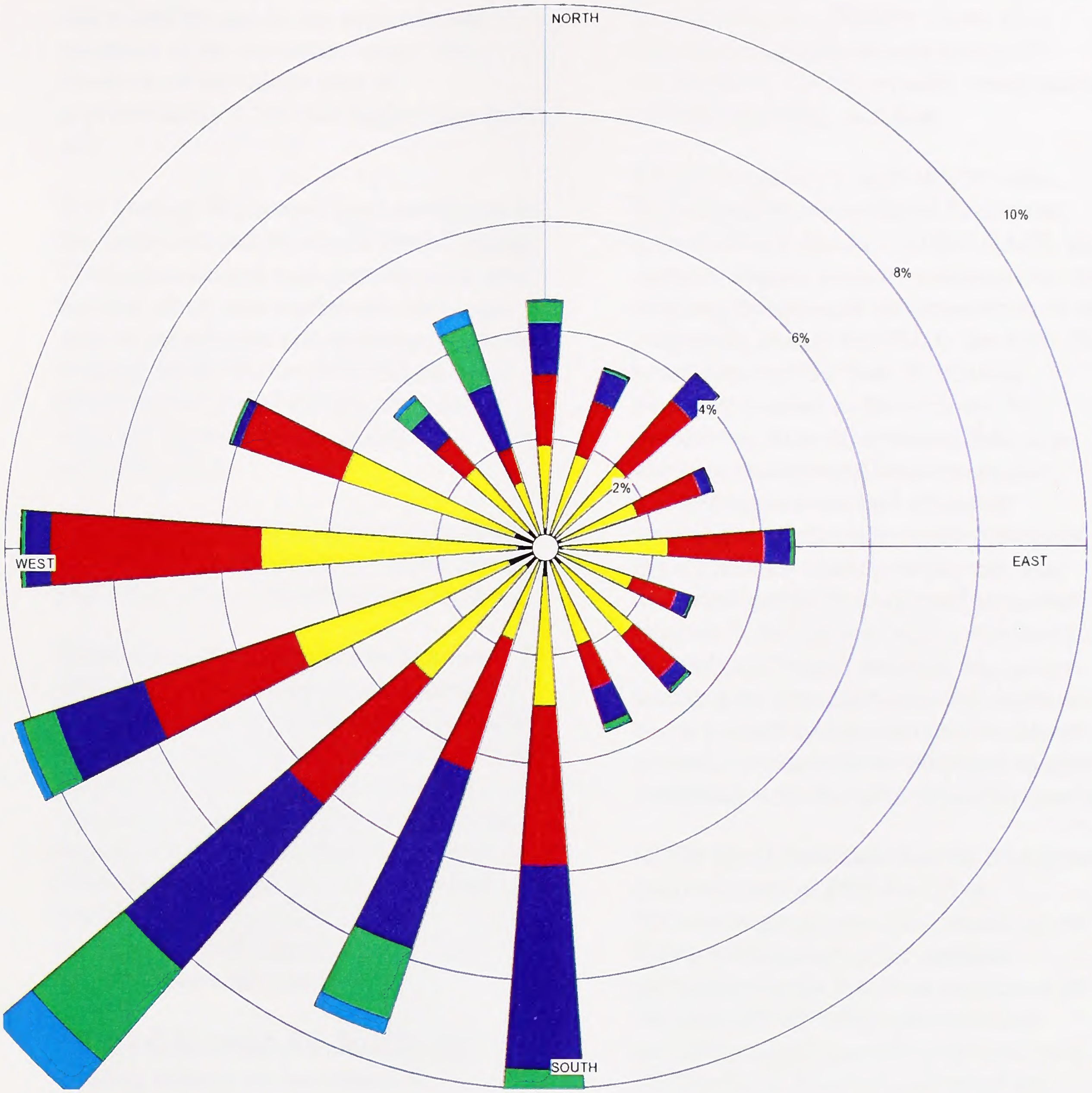
During the rainy period (July to September), local terrain influences both the winds and rainfall patterns. Moisture from the tropics enters the region from the south and east, interacts with local terrain-influenced upslope winds and intense surface heating, and produces high-altitude convective thunderstorms. These storms may produce significant rainfall, however, rainfall amounts vary considerably from location to location because of the spatial and temporal variation of these types of storm systems.

3.6.1.1.2 Physical Features of Site

Proposed Action. The Proposed Action power plant site would be approximately 12 miles northwest of Mesquite. The East Mormon Mountains lie west of the plant site; the plant would be approximately 5 miles east of the peaks and 3 to 4 miles

Project: Toquop Energy Facility

Station #23169 - LAS VEGAS/MCCARRAN INT'L ARPT, NV



Wind Speed (m/s)

🟦	> 11.06
🟩	8.49 - 11.06
🟪	5.40 - 8.49
🟥	3.34 - 5.40
🟨	1.80 - 3.34
⬛	0.51 - 1.80

MODELER: McCarter	DATE **4/10/2002**
DISPLAY **Wind Speed**	UNIT **m/s**
AVG. WIND SPEED **4.55 m/s**	CALM WINDS **1.83%**
ORIENTATION **Direction (blowing from)**	PLOT YEAR-DATE-TIME **1990** **Jan 1 - Dec 31** **Midnight - 11 PM**

Representative Wind Rose for the Toquop Area

Figure 3-1

WRPLOT View 3.5 by Lakes Environmental Software - www.lakes-environmental.com

east of the base of these mountains. The mountains run north-south, and the plant site would be east of the approximate midpoint of the mountain range. The elevation of the tallest peak is approximately 2,755 feet higher than the site.

The Toquop Wash runs from northwest to the southeast, and the South Fork Toquop Wash runs west to east past the plant site. Several other, less significant, drainages also run nearby the site and empty into the Toquop Wash. While these are dramatic physical features of the site, they are of little consequence in air quality considerations.

Alternative 1. The description of physical features for the Alternative 1 plant site is identical to that of the Proposed Action.

Alternative 2. The Alternative 2 power plant would be located approximately 11 miles northwest of the Proposed Action plant site, on the southern end of the Tule Desert. The desert is characterized by relatively level topography, bordered to the east and south by small mountains. This location is approximately 2 miles northwest of the peak of Jumbled Mountain, which rises approximately 800 feet above the site location.

3.6.1.1.3 Existing Air Quality. With no existing sources of man-made air emissions in the vicinity, the southern and northern plant sites are presumed to have similar existing air quality. All of Lincoln County is in full attainment of ambient air quality standards; that is, existing background concentrations for all criteria air pollutants are less than the maximum allowable ambient concentrations under Nevada and federal regulations. These criteria pollutants include oxides of nitrogen (NO_x), sulfur dioxide (SO_2), carbon monoxide (CO), particulate matter with mean aerometric diameter smaller than 10 microns (PM10), ozone (O_3) which is controlled by regulating the emissions of volatile organic compounds (VOCs) and NO_x, and lead.

Based on guidance from the Nevada Division of Environmental Protection Bureau of Air Quality (NDEP BAQ), the ambient impact analysis assumes that the existing background concentrations of all pollutants, except for PM10, are zero. This is reflective of the lack of existing emission sources in the vicinity. No monitoring data exist to establish more accurate background concentrations; however, given the lack of major transportation corridors or communities in the immediate vicinity of the site, and considering that all permitted air pollution sources in the vicinity were considered in the ambient impact analysis, any actual background concentrations are assumed to be very small compared to the localized, modeled impacts of the proposed facility combined with the other emission sources.

NDEP BAQ estimates that the background concentration of PM10 is up to 10.2 micrograms per cubic meter (ug/m^3). While no monitoring for ambient particulate levels has been conducted in the area, NDEP BAQ estimates that windblown dust caused by the hot, arid conditions of the site could reach this level.

Four designated Federal Class I air quality areas exist within 200 kilometers (125 miles) of the Proposed Action power plant site. These include Grand Canyon National Park, which is the nearest at 78 kilometers (49 miles) from the southern Toquop site, and the Sycamore Canyon Wilderness Area, Bryce Canyon National Park, and Zion National Park. The Lake

Mead National Recreation Area is a designated Federal Class II air quality area and is approximately 48 kilometers (30 miles) south of the southern Toquop power plant site.

3.6.1.2 Pah Rah Parcel

Washoe County's climate is mild, with low humidity and rainfall. It is characterized as semi-arid to arid with average annual precipitation ranging from 4 to 16 inches. The average annual temperature in Reno is 48ºF in the winter and 88ºF in the summer.

Portions of Washoe County are currently designated as non-attainment areas in meeting air quality standards for PM10 and CO, and all of Washoe County is designated as a moderate non-attainment area for ozone. The Truckee Meadows Hydrographic Basin (Reno/Sparks urban area) defines the boundaries for the PM10 non-attainment area. The boundaries for the CO non-attainment area are also considered to be the Truckee Meadows Basin. The Pah Rah parcel would be outside of the PM10 and CO non-attainment areas.

3.6.2 Noise

This section addresses existing noise sources and levels in the Toquop and Pah Rah areas. It also describes noise regulations applicable to development on BLM land and in Lincoln and Washoe Counties.

Noise levels in the Toquop and Pah Rah areas are affected by numerous factors. These factors include: a site's general setting, such as isolated, rural, suburban, or urban; nature of the noise sources or activities occurring in those settings; proximity of the receptor to the noise source or activity; time of day; and various attenuating factors that can mute or interrupt noise waves, such as vegetation, topographic features, buildings, and atmospheric conditions.

Noise levels are measured in units of A-weighted decibels (dBA), which are roughly proportional to loudness as perceived by the average person. Common sound levels covering the full range of human hearing vary from about 10 to 110 dBA. Examples of the variation in noise levels follow: 25 to 35 dBA in rural or remote areas with little human activity; 40 to 50 dBA in a typical office; 50 to 60 dBA in a suburban neighborhood; 60 to 80 dBA along a busy city sidewalk; 80 to 90 dBA from a lawnmower (at the operator); and about 90 dBA from a large truck (at a distance of 50 feet) (USIBWC et al., 2000).

3.6.2.1 Toquop Area

Both the southern plant site and the northern plant site are located within an undeveloped area. Except for the high-voltage transmission lines located near the southern plant site, the dirt road near both the southern and northern plant sites, and the disturbance near the northern plant site from well drilling, no aboveground human-made development exists in the area. The transmission lines emit a hum. No other human-caused noise sources appear to exist in the area, except for overflights of military airplanes (both jet and propeller) and helicopters, which are noisy. The two sites (southern and northern), located approximately 11 miles and 22 miles, respectively, from I-15, are remote from any urban area.

Typical noise levels in the area are estimated to be between 25 and 50 dBA, depending on the distance from the transmission lines. No residences, schools, or parks (considered sensitive noise receptors) are located in the area.

The Toquop parcels are currently public land under the jurisdiction of the BLM, and are subject to the management guidance included in the Caliente MFP. The Caliente MFP does not contain noise regulations or standards (BLM, 1999).

If either the southern or northern Toquop parcel is exchanged for the Pah Rah parcel, it would be under the jurisdiction of Lincoln County. The Lincoln County Zoning Ordinance does not contain noise regulations or standards (Lincoln County, 2001b).

3.6.2.2 Pah Rah Parcel

The Pah Rah parcel is located within a relatively undeveloped area and no development exists on the Pah Rah parcel. Two 345-kV electric transmission lines are aligned north of the site. A dirt road leads to the transmission lines. I-80 is 1.25 miles south of the parcel. The Union Pacific Railroad tracks are on the south side of I-80. The transmission lines emit a hum that is not audible from the parcel, but the Union Pacific Railroad and I-80 traffic generate noise that is audible from the parcel. South of the site and north of I-80 is a wooden single-pole 60 kV electric transmission line. The Truckee River is on the south side of I-80 and generally parallels the freeway in this area. A mine is located in the mountains south of the Pah Rah parcel on the south side of I-80. The closest community to this parcel is Wadsworth, several miles to the east.

Typical noise levels within the Pah Rah parcel are estimated to be between 25 and 32 dBA, depending on the location within the site and wind direction. No residences, schools, or parks (considered sensitive noise receptors) are located in the area.

The Pah Rah parcel is currently privately owned land, and is subject to the regulations included in the Washoe County Comprehensive Plan (Washoe Plan). The Washoe Plan does not contain noise regulations or standards (Washoe County, 2000a).

If the parcel is exchanged for either the southern or northern Toquop parcel, it would come under the jurisdiction of the BLM. The BLM's Carson City Field Office Consolidated Resource Management Plan (CRMP) does not contain noise regulations or standards (BLM, 2001a).

3.7 Visual Resources

The existing landscape in the vicinity of the Toquop area and the Pah Rah parcel is described in this section. It also discusses the BLM's Visual Resource Management (VRM) Program.

The BLM has developed a system (the VRM Program) for evaluating the visual resources of a given area to determine what degree of protection, rehabilitation, or enhancement is desirable and possible. The BLM is concerned with managing visual resources equally with other resources and attaining acceptable levels of visual impact without unduly reducing commodity production or limiting overall program effectiveness.

The objective of VRM is to manage public lands in a manner that will protect the quality of the scenic (visual) values of these lands. According to BLM policy, "...visual design considerations shall be incorporated into all surface disturbing projects regardless of size or potential impact. Emphasis shall be placed on providing these inputs during the initial planning and design phase so as to minimize costly redesign and mitigation at later phases of the project design and development…"

Perception of visual quality in a landscape is based on the following common principles:

- Landscape character is determined by four basic visual elements (form, line, color, and texture), which are present in every landscape and exert varying degrees of influence.
- As the influence exerted by these elements increases, the landscape becomes more interesting.
- As the visual variety in a landscape increases, the landscape becomes more aesthetically pleasing. Variety in the landscape without harmony is considered unattractive; landscape alterations that create disharmony are considered unattractive (BLM, 1980).

The objectives for four VRM Classes are the following:

- **Class I Objective.** The objective of this class is to preserve the existing character of the landscape. The level of change to the characteristic landscape should be very low and must not attract attention.
- **Class II Objective.** The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low.
- **Class III Objective.** The objective of this class is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate.
- **Class IV Objective.** The objective of this class is to provide for management activities which require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the focus of major attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements.

3.7.1 Toquop Area

Sites of proposed project features in the Toquop area appear as relatively flat land (except where the Toquop Wash would be crossed) that exhibits hues of creams, tans, and grays. Vegetation onsite and along the access road includes species such as Cholla cactus, Mormon tea, galleta grass, Joshua trees, creosote, and white bursage. This vegetation adds texture and contrast, and provides some visual interest to the relatively level landscape. The southern and northern Toquop parcels appear undeveloped except where three high-voltage transmission lines cross a corner of the southern parcel.

The East Mormon Mountains to the west are clearly visible from the southern plant site. In addition, the Mormon Mountains (approximately 5.5 miles west of the southern Toquop parcel) and the Mormon Mountains Wilderness Study Area (3.75 miles west of the southern Toquop parcel) are visible beyond the East Mormon Mountains from the southern

Toquop parcel. The East Mormon Mountains are at approximately elevation 4000 feet in this area and the Mormon Mountains are at elevations 4200 to 5200 feet. Further south, the East Mormon Mountains are taller than the Mormon Mountains and obstruct views of the Mormon Mountains from the southern plant site. The East Mormon Mountains would also obstruct views of the plant site from the south end of the Mormon Mountains.

Neither the southern or northern Toquop parcel is visible from I-15.

The BLM currently manages the land that includes the Toquop parcels and alignments as VRM Class IV.

3.7.2 Pah Rah Parcel

The Pah Rah parcel consists of steep-sided mountain slopes. No roads, transmission lines, or other human-made development exist on the site. Section survey markers are present, but are not apparent to the untrained eye. Vegetation consists of low-lying desert vegetation common to the area. Loose dark-colored rock is present along the hillsides and provides a contrast to the lighter-colored slopes. An undeveloped hiking trail along the west side of the slope exists, but is not noticeable from a distance. No recreational or other hiking trails exist on the Pah Rah parcel, although numerous game trails lead to the parcel and cattle paths exist below it. The undeveloped nature of the parcel reflects the natural character of the mountains in the area. In views of the parcel from the north, the colors represented are tans, creams, and warm browns. Low-lying desert vegetation is visible, as is loose rock on the slopes. Two 345-kV transmission line corridors exist to the north of the parcel. A mine exists to the south on the south side of I-80. I-80 is approximately 1.25 miles south of the parcel and is visible from the southern edge of the top of the mesa.

Views from the top of the Pah Rah parcel include the cement plant in Fernley to the east, the diatomite mine and associated mining scars in the mountains to the south, I-80 to the south, the Truckee River on the south side of I-80, and the Union Pacific Railroad tracks, also on the south side of I-80. Views to the north are of other mountains, the Olinghouse Mine and its heap leach area, open space (undeveloped land), and the two 345-kV transmission line corridors.

The nearest freeway offramp to the Pah Rah parcel is the Derby Dam exit, approximately 1.5 miles southwest of the site. From this viewpoint looking north, the parcel appears undisturbed. From the south, the slopes of the parcel are shades of pinks, grays, and dark brown. No vegetation appears visible, and no shades of green are visible.

The Pah Rah parcel is privately owned land; however, the BLM has classified the area that includes the Pah Rah parcel according to its VRM Program. Roughly the northwest quarter of the Pah Rah parcel is designated VRM Class IV, and the remainder of the parcel is designated VRM Class III. Class IV lands surround the parcel to the north, northwest, and west. Class III lands surround the parcel to the northeast, east, southeast, south, and southwest (BLM, 2001a).

3.8 Recreation Resources

This section describes existing recreation resources in the vicinity of the Toquop area and Pah Rah parcel.

3.8.1 Toquop Area

The Toquop area is relatively remote. It does not appear that OHVs or other recreationists use the area frequently. However, the area is used by bird (quail) and big game hunters during identified seasons. Several bird guzzlers and springs are present west of the area in the East Mormon Mountains. Hunting and trapping of fur bearers also occurs in the area. Seasonal wildflower sighting and bird watching may be the primary recreational uses during the spring. The Toquop Wash is used by OHVs year-round and by quail hunters in the fall.

The southern and northern Toquop parcels are approximately 20 miles north of the north arm of Lake Mead. The closest recreation area is Overton Beach on the north arm of the lake. Lake Mead is part of the Lake Mead National Recreation Area, which encompasses Lake Mead, Lake Mohave, and both federal and nonfederal land.

3.8.2 Pah Rah Parcel

The Pah Rah parcel is relatively remote. The remote nature of the parcel and its private ownership limits the amount of recreation opportunities available to the public. Its remoteness, particularly the lack of direct vehicular access and its steep terrain, probably are the overriding reasons for the lack of recreational use.

The Pah Rah parcel is approximately 13 miles south of Pyramid Lake and 2 miles north of the Truckee River. Pyramid Lake lies within the Pyramid Lake Reservation (Tribal lands). A hot spring exists there. Fishing also occurs at Pyramid Lake. Tours are given at the fish hatcheries. A marina and a visitor center with a store are located at the lake.

Picnicking, fishing, and rafting occur at various locations along the Truckee River. Opportunities for recreational trails are limited in the Truckee Canyon planning area because of its steep terrain and remote location (Washoe County, 2000b).

3.9 Land Use, Prime or Unique Farmlands, and Rangelands

3.9.1 Toquop Area

3.9.1.1 Existing Land Use and Land Ownership

3.9.1.1.1 Project Site Land Use and Ownership. The Toquop area is public land administered by the BLM. The southern Toquop parcel is within Assessor Parcel Number (APN) 08-251-01. This parcel is described as Section 36, T11S, R69E in Lincoln County, Nevada. The southern Toquop parcel is currently uninhabited, with development restricted to a series of dirt roads and utility corridors. Properties immediately adjoining the southern Toquop parcel are also administered by the BLM.

A title report was prepared for the area generally covered by: 1) the access road from I-15 north to the southern Toquop parcel; 2) the southern Toquop parcel; 3) the western pipeline alignment; 4) the northern Toquop parcel; 5) the majority of the wellfield area; and 6) the northern half of the eastern pipeline alignment (Stewart Title of Northern Nevada, 2001).
Table 3-4 lists the existing easements and rights-of-way identified.

TABLE 3-4
Easements and Rights-of-Way in the Toquop Area

Affected Project Location	Easement/Right-of-Way
Southern Toquop parcel	Easements and rights-of-way for power transmission lines, oil and gas pipelines, oil and gas facilities, fiber optic facilities, and incidental purposes
Access road from southern Toquop parcel south to Clark County border	Easements and rights-of-way for power transmission lines, oil and gas pipelines, oil and gas facilities, fiber optic facilities, coal slurry pipeline, telephone and telegraph line and facilities, communication site, radio repeater site, microwave radio relay site, water gauge system (rain gauge), access road, and incidental purposes
Access road from Clark County border south to I-15	Easements and rights-of-way for highway, communication site, microwave radio relay site, underground phone line, vortac site, material sites, access road, and incidental purposes, and protective easement
	Matters relating to an airport lease in favor of the Federal Aviation Administration
	Matters relating to a land conveyance in favor of the City of Mesquite
	Easements and rights-of-way for wind monitors on Flat Top and Mormon mesas and incidental purposes
Northern Toquop parcel	Easements and rights-of-way for water facility and incidental purposes
Northern portion of eastern pipeline alignment	Unrecorded easements and rights-of-way for water facility and incidental purposes
Western pipeline alignment	Easements and rights-of-way for water facility and incidental purposes
Wellfield area	Easements and rights-of-way for water facility and incidental purposes
Southern Toquop parcel	Terms, conditions, restrictions, covenants, and provisions of proposed land exchange
All Toquop project areas except wellfield area	Terms, conditions, restrictions, covenants, and provisions set forth in application dated June 15, 2001, filed by Toquop Energy, Inc., and Lincoln County, Nevada, with BLM
Areas along Kern River Gas Pipeline affected by project features	Terms, conditions, restrictions, covenants, and provisions as set forth in "Construction, Operating and Maintenance Agreement" dated July 17, 1998, between Kern River Gas Transmission, a Texas General Partnership, and Williams Communications, Inc. a Delaware Corporation, recorded February 25, 1999

Source: Stewart Title of Northern Nevada (2001).

3.9.1.1.2 Transportation and Urban Uses. The transportation corridor closest to the Toquop parcels is I-15, located approximately 11 miles from the site of the Proposed Action. I-15 is a major highway that passes through Las Vegas and connects Salt Lake City to Los Angeles. An unimproved dirt road leads to the southern and northern Toquop parcels from I-15.

The urban center nearest the Toquop parcels is the City of Mesquite, approximately 12 miles to the southeast. Other than electrical transmission, fiber optic communication, and natural gas lines, no residential, commercial, or industrial land uses are located within or adjacent to the two Toquop parcels.

3.9.1.1.3 Mining Uses. BLM's databases contain no records of mining claims, mineral leases, or mineral rights-of-way within the project area. Patented and unpatented claims for gypsum have occurred offsite, approximately 0.5 mile to 7 miles away.

Current exploration activities include several small barite veins that were prospected about 4.5 miles northwest of the southern power plant site.

The Snowhite gypsum deposit occurs about 2 miles north of the southern power plant site on the northeast side of the Toquop Wash. Additional recent exploration for gypsum has occurred 4 miles southwest of the southern power plant site.

Exploration for minerals continues in the area—primarily for gypsum. The potential for minerals supports continued exploration. However, the current development potential for these mineral resources is low based on the availability of sources closer to economic centers and prices.

3.9.1.2 Designated Land Use

BLM-designated land uses in the project area include grazing allotments, ACECs, WSAs, and critical habitat. These land uses are described in the appropriate sections of this DEIS.

The Toquop area is designated "A-5" (agriculture with a 5-acre minimum) according to Lincoln County. The "A" agricultural district is established for areas particularly suited for raising crops and animals and other related agricultural activities. Permitted uses include those related to agricultural uses. Uses subject to special use permit include agricultural industries; dumps; forest industries; golf courses; livestock feed yards; recreational resorts; and public utility or public service buildings, structures, and uses (Lincoln County, 1990).

3.9.1.3 Prime or Unique Farmlands

Prime farmland, as defined by the U.S. Department of Agriculture, is that land best suited to producing food, feed, forage, fiber, and oilseed crops. It has the soil quality, growing season, and moisture supply needed to economically produce sustained high crop yields if acceptable farming methods are used. Prime farmland produces the highest yields with minimal inputs of energy and money, and farming it results in the least damage to the environment. Prime farmland is either currently used for producing food or fiber or is available for this use. Prime farmland usually has an adequate and dependable supply of moisture from precipitation or irrigation. It has few or no rocks and is permeable to water and air. Prime farmland is not excessively erodible or saturated with water for long periods or frequently flooded during the growing season. The slope ranges mainly from zero to 6 percent (NRCS, 1990).

Approximately 94,400 acres (nearly 3.5 percent of Lincoln County [south part] soil survey area) would meet the requirements for prime farmland if an adequate and dependable supply of irrigation water were available and the soils were reclaimed to reduce salinity and alkalinity. None of the soil map units on the Toquop parcels meet the soil requirements for prime farmland (NRCS, 1990).

The Virgin River area soil survey area, which includes the access road from I-15 heading north for roughly half the distance to the southern Toquop parcel (8 miles), is not prime farmland (NRCS, 1970).

Unique farmland is land other than prime farmland that is used for the production of specific high-value food and fiber crops. It has the special combination of soil qualities, location, growing season, and moisture supply needed for the economic production of sustained high yields of a specific high-quality crop when treated and managed by acceptable farming methods. Unique farmland is used for a specific high-value food or fiber crop; has an adequate supply of available moisture for the specific crop because of stored moisture, precipitation, or irrigation; and has a combination of soil qualities, growing season, temperature, humidity, air drainage, elevation, aspect, and other factors, such as nearness to markets, that favor the production of a specific food or fiber crop. No soils in Nevada are currently recognized as unique farmland (NRCS, 1990).

3.9.1.4 Rangelands

Rangeland provides many important resource values: it acts as a vast watershed and provides habitat for wildlife, livestock forage, and opportunities for recreation. The resource values of rangeland are intricately interrelated and are often directly affected by rangeland management. Proper management of rangeland depends on many factors: the season of grazing use, the species of grazing animal, the intensity and distribution of grazing, and the range resource potential (NRCS, 1990).

Approximately 98 percent of the acreage in the Lincoln County, Nevada, South Part, soil survey area is rangeland. This survey area includes the southern and northern Toquop parcels, the alignments, the wellfield, and the access road from the southern Toquop parcel heading south for approximately 7 miles. All of the wellfield/pipeline are located within portions of the White Rock (2,880 animal unit months [AUMs]), Garden Springs (2,809 AUMs), Summit Spring (715 AUMs), Snow Springs (3,567 AUMs), or Gourd Spring (3,458 AUMs) grazing allotments (see Maps 3-10, 3-11, and 3-12). The allotments are shown for each alternative. These allotments are utilized during the fall, winter, and spring. The southern parcel lies within the Gourd Spring Allotment. This parcel has been removed from livestock management because of the Gourd Springs ACEC boundary fence. The northern parcel lies within the southern portion of the Garden Springs Allotment. Livestock grazing is the principal agricultural use of the rangeland (NRCS, 1990).

An Environmental Assessment (EA) was recently prepared that addressed the Gourd Springs ACEC boundary fence. The fence was completed in December 2001. It is located along the western section line of Section 36, T11S, R69E (the southern Toquop parcel). The purpose of the fence is to restrict livestock from entering the Mormon Mesa ACEC, which is closed to livestock (BLM, 2001b).

Most of the acreage in the Virgin River soil survey area, which includes the access road from I-15 heading north for roughly half the distance to the southern Toquop parcel (8 miles), is rangeland. This area lies within the Mormon Mesa Allotment administered by the Las Vegas Field Office. The Mormon Mesa Allotment has been closed to livestock management because of the Record of Decision for the Management of Desert Tortoise Habitat EIS.

3.9.2 Pah Rah Parcel

3.9.2.1 Existing Land Use and Land Ownership

3.9.2.1.1 Project Site Land Use and Ownership. The Pah Rah parcel is owned by Nevada Land & Resource Company LLC (NLRC) (see Map 3-13). The parcel is APN 84-040-12, described as Section 9, T20N, R23E in Washoe County, Nevada. The Pah Rah parcel sets atop a mesa that is uninhabited. No activity on the parcel is visible other than the placement of survey markers. Properties immediately adjoining the Pah Rah parcel to the north, east, south, and west are administered by the BLM. Properties adjoining the Pah Rah parcel to the northwest, northeast, and southeast are owned by NLRC. No roads, rights-of-way, or easements are known to occur on the Pah Rah parcel. Road rights-of-way are located west, northwest, and north of the parcel, and pipeline rights-of-way are located south of the parcel. High-voltage electric transmission lines are located north and south of the parcel.

3.9.2.1.2 Transportation and Urban Uses. The transportation corridor closest to the Pah Rah parcel is I-80, located approximately 1.25 miles south of the parcel. I-80 is a major east-west interstate freeway. An unimproved dirt road leads to within 0.25 mile of the northwest corner of the Pah Rah parcel from State Route 447 (SR 447), which intersects I-80 near Wadsworth, Nevada.

The urban center nearest the Pah Rah parcel is the Pyramid Lake Indian Reservation community of Wadsworth, 5.5 miles to the east. No residential or commercial land uses are located in the vicinity of the Pah Rah parcel. An industrial use (a gold and silver mine) exists approximately 2 miles north, and another mine (diatomite) exists approximately 3 miles south of the Pah Rah parcel on the south side of I-80. The Union Pacific Railroad also maintains an active railroad line that generally parallels I-80 and the Truckee River near the Pah Rah parcel.

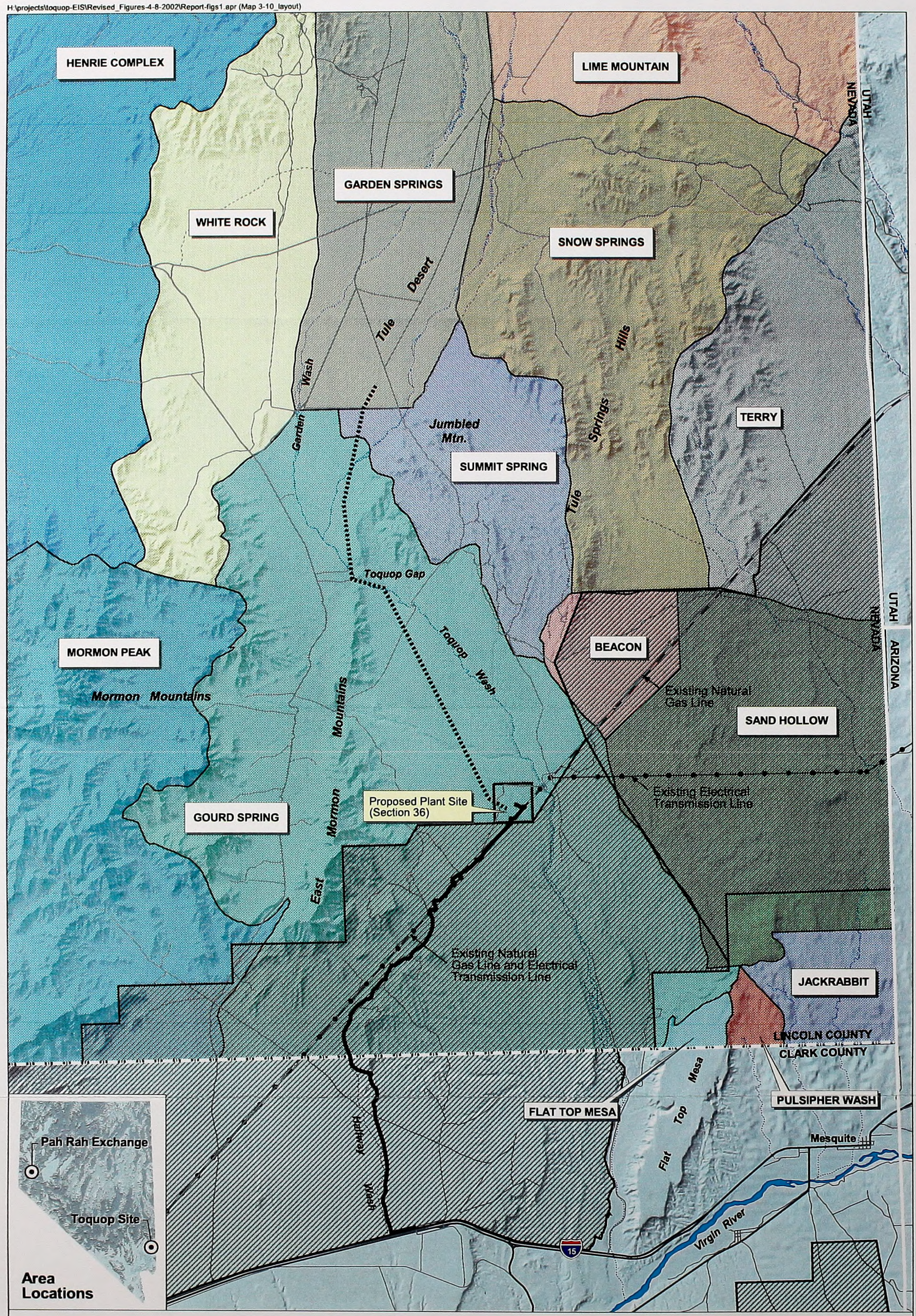
3.9.2.1.3 Mining Uses. Because the parcel is privately owned land, it has not been available for mining by the public. There are no records or evidence of past prospecting activity on the Pah Rah parcel. No gold or other economic mineral occurrences have been identified on the Pah Rah parcel.

The most important industrial minerals found near the Pah Rah parcel are gold and silver, limestone for cement manufacturing, and diatomite. Cement manufacturing also requires small amounts of clay and gypsum which are obtained locally. Aggregates such as sand, gravel, pumice, and minor perlite have been mined west of the Pah Rah parcel, near Reno, and to the east near Fernley, Nevada (BLM, 2001e).

3.9.2.2 Designated Land Use

The Pah Rah parcel is zoned A-11 (Agricultural Deferred). Agricultural zoning refers to onsite production of plant and animal products by agricultural methods, including agricultural processing, sales, and production; animal slaughtering; crop production; forest products; game farms; and produce sales (Washoe County, 2000c).

H:\projects\toquop-EIS\Revised_Figures-4-8-2002\Report-figs1.apr (Map 3-10_layout)



N

0 6250 12500 18750 Feet

Source:
1:100,000 Vector Linework - BLM Nevada,

Legend

▨ Area of Critical Environmental Concern (ACEC)

━ Access Road

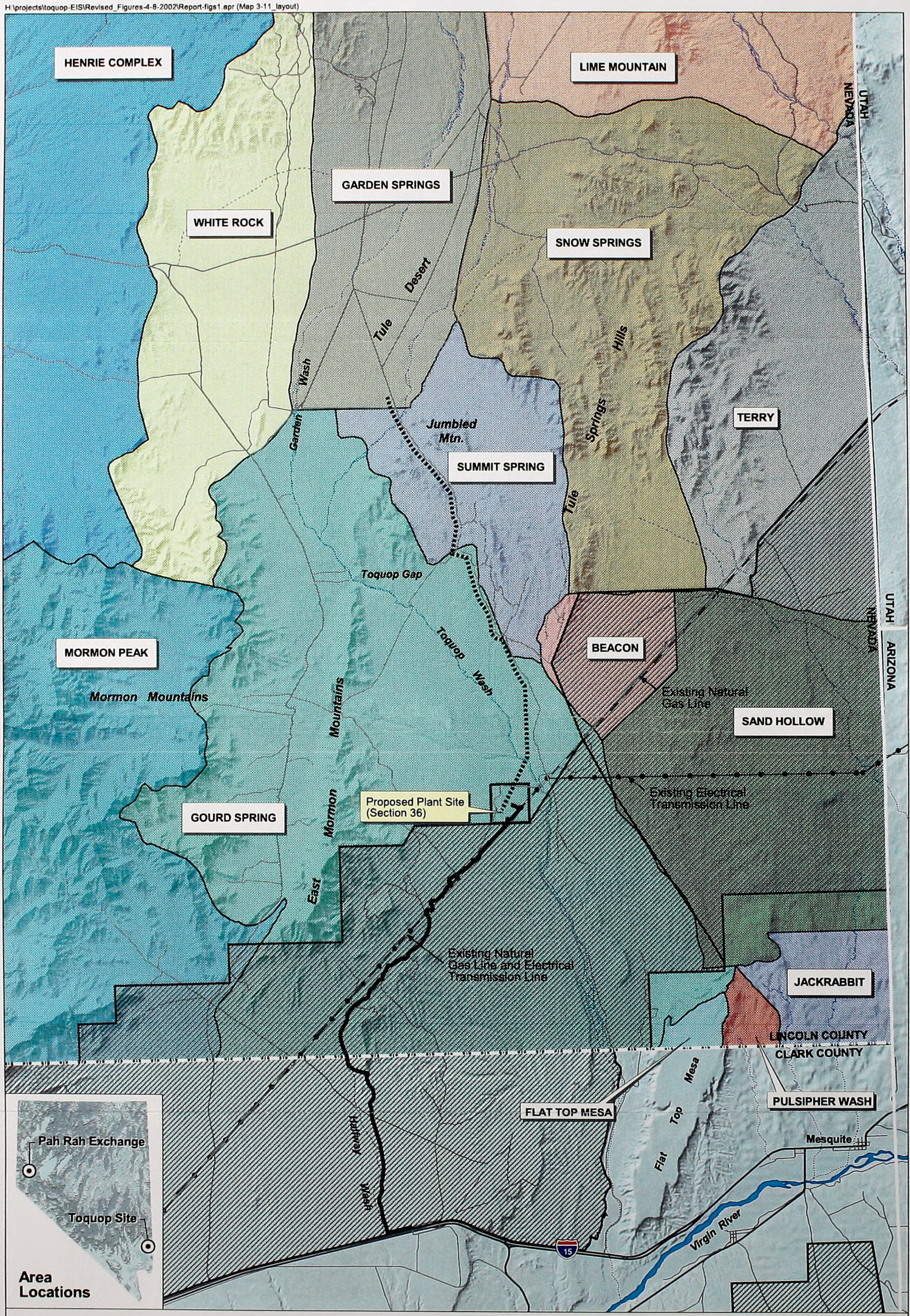
┅ Water Pipeline

Toquop Energy Project
Grazing Allotments
Proposed Action

Map 3-10

CH2MHILL

H:\projects\toquop-EIS\Revised_Figures-4-8-2002\Report-figs1.apr (Map 3-11_layout)



N

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Source:
1:100,000 Vector Linework - BLM Nevada,

Legend

▨ Area of Critical Environmental Concern (ACEC)

━ Access Road

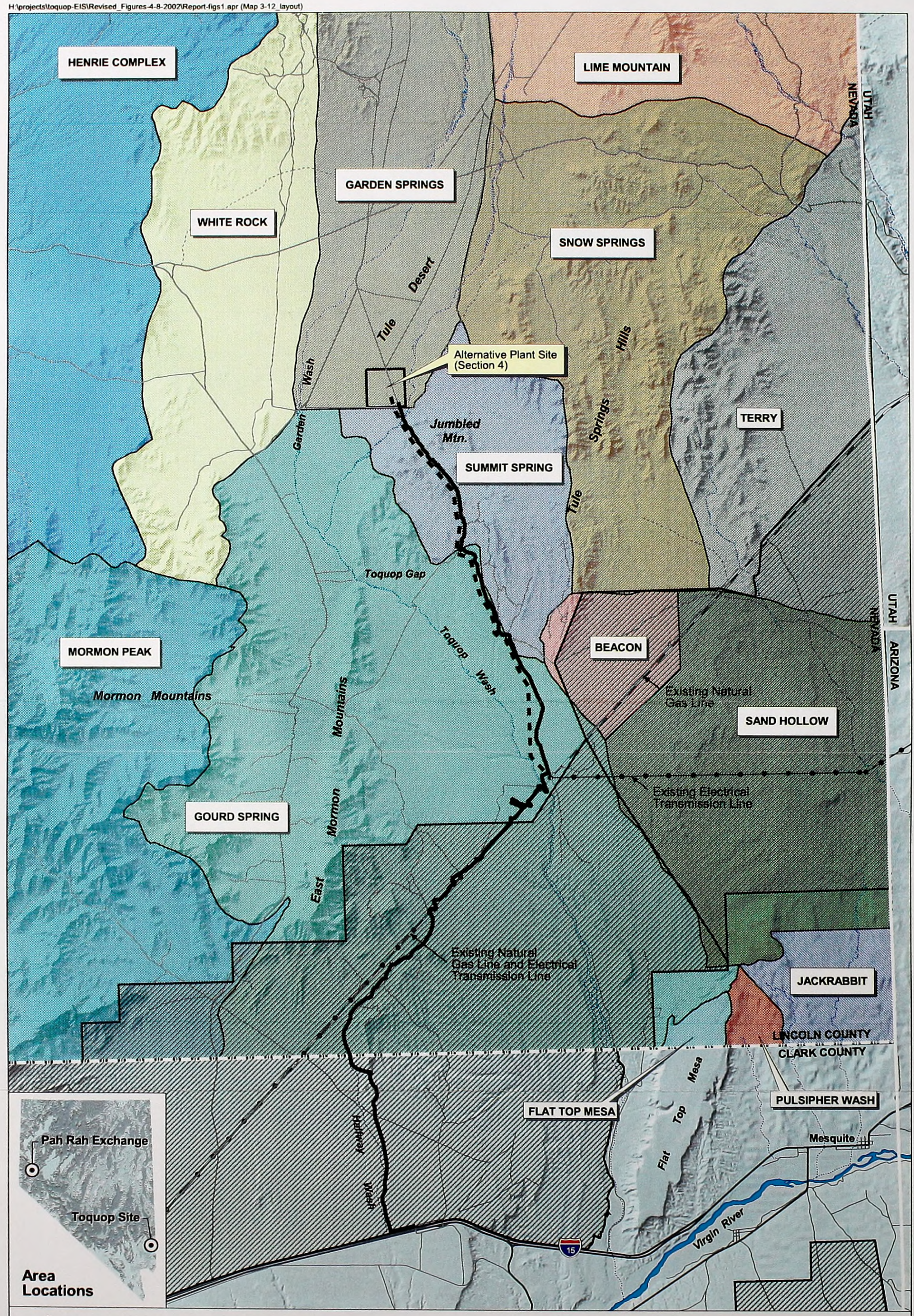
┅ Water Pipeline

Toquop Energy Project
Grazing Allotments
Alternative 1

Map 3-11

CH2MHILL

H:\projects\toquop-EIS\Revised_Figures-4-8-2002\Report-figs1.apr (Map 3-12_layout)



N

0 6250 12500 18750 Feet

Source:
1:100,000 Vector Linework - BLM Nevada,

Legend

▨ Area of Critical Environmental Concern (ACEC)

━ Access Road

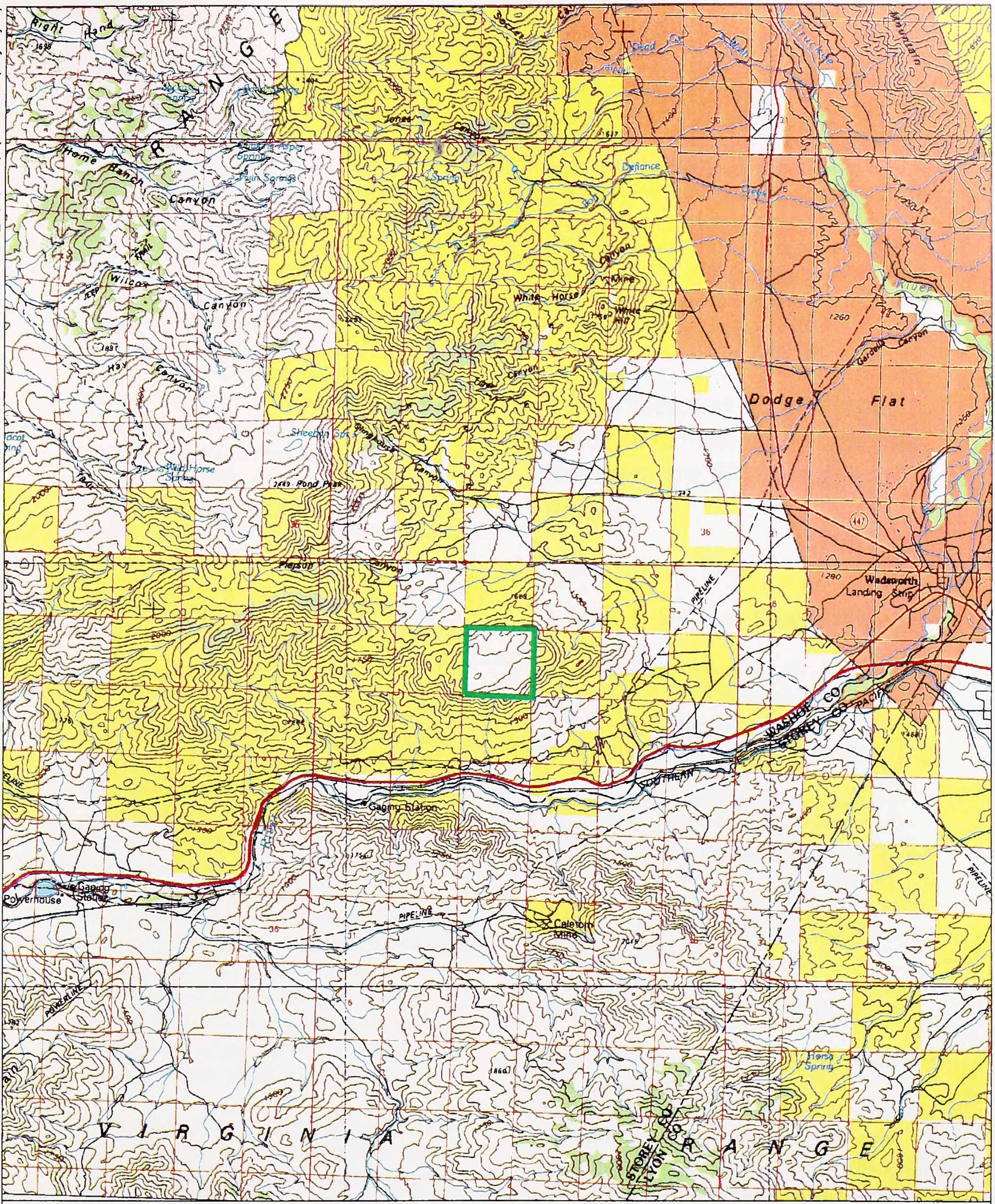
╍ Gas Pipeline and Transmission Line

Toquop Energy Project
Grazing Allotments
Alternative 2

Map 3-12

CH2MHILL

H:\projects\toquop-water_toquop-eis.apr (Pah Rah Property Layout)



N

0 1 2 3 Miles

Sources: BLM 1:100,000 scale Land Ownership Data
USGS 1:100,000 scale DRG - Reno

Legend

- 🟩 Pah Rah Property
- 🟨 Bureau of Land Management
- 🟧 Tribal Lands
- 🟥 Private

Land Status in the Vicinity of the Pah Rah Property

Township 20 North,
Range 23 East, Section 9

Map 3-13

CH2MHILL

The Pah Rah parcel is located within a grazing allotment area identified by the BLM (2001a).

3.9.2.3 Prime or Unique Farmlands

The definition of prime farmland in Washoe County is similar to that for Lincoln County except that the slope ranges mainly from zero to 4 percent in Washoe County (south part) (NRCS, 1979). About 30,000 acres (3 percent of Washoe County [south part] soil survey area) meets the soil requirements for prime farmland provided that adequate irrigation water is available. None of the soil map units on the Pah Rah parcel meet the soil requirements for prime farmland (NRCS, 1979).

No soils are currently recognized as unique farmland in Nevada (NRCS, 1990).

3.9.2.4 Rangelands

The objective in range management is to manage grazing so that the plants growing on a site are approximately the same in kind and amount as the potential natural plant community for that site. Such management generally results in the optimum production of vegetation, reduction of undesirable brush species, conservation of water, and control of water erosion and soil blowing. Sometimes, however, a range condition below the potential meets grazing needs, provides wildlife habitat, and protects soil and water resources (NRCS, 1979).

The soils within the Pah Rah parcel, (the Oppio-Rezave-Rock outcrop association, Osobb, Rezave-Fireball association, and Bombadil-Hefed-Rubble land association) are used as, or are suitable for, rangeland (NRCS, 1979).

The Pah Rah parcel lies within the Olinghouse Grazing Allotment, with 696 AUMs. Grazing utilization levels are maintained at 55 percent or less to preserve the existing ecological condition and trends. An annual allowance of 182 AUMs exists within this allotment to maintain existing mule deer habitat. No evidence of grazing was observed on the parcel during the spring field reconnaissance (BLM, 2001b).

3.10 Wilderness Study Areas, Areas of Critical Environmental Concern, and Wild and Scenic Rivers

3.10.1 Toquop Area

3.10.1.1 Wilderness Study Areas

The Proposed Action and all alternatives do not lie within a Wilderness Area, Wilderness Study Area (WSA), or Instant Study Area (ISA). Three WSAs are located north and west of the proposed locations of project features associated with the Toquop Energy Project. These include the Clover Mountains WSA (NV-050-139), the Meadow Valley Range WSA (NV-050-156), and the Mormon Mountains WSA (NV-050-161). Portions of all three WSAs have been recommended as suitable for wilderness designation by the BLM (BLM, 1991).

The Mormon Mountains WSA is closest to the southern Toquop parcel. This 162,886-acre WSA is 3.75 miles west of the southern parcel. The western water pipeline alignment is approximately 1 mile east of the Mormon Mountains WSA. The northern Toquop parcel is approximately 5 miles east of, and the potential wellfield abuts, the Mormon Mountains WSA.

Maps 3-14, 3-15, and 3-16 show lands in the project area that have been designated as WSAs and Areas of Critical Environmental Concern (discussed in Section 3.10.1.2), and locations of project features for the Proposed Action, Alternative 1, and Alternative 2, respectively.

The BLM conducted a statewide wilderness inventory in 1979 and 1980. In that inventory, the Tule Desert (NV-050-01R-29), Lime Mountain (NV-050-0159), Tule Springs Hills (NV-050-0180), Hollow Wash (NV-050-01R-30), and Lone Mesa (NV-050-210) units were inventoried and dropped from further consideration as wilderness. According to the inventory report, the Tule Desert Unit included, "…a highway, paved roads, reservoirs, structures and communication sites (which) divide the area into parcels of less than 5, 000 acres each and clearly leave the unit in an unnatural condition…" The report also stated that the area had little topographic screening and did not have outstanding opportunities for recreation. The Lime Mountain Inventory Unit (NV-050-0159) was dropped from further consideration as wilderness because the area did not have an outstanding opportunity for solitude because of insufficient vegetative screening. In addition, recreation opportunities in the area were not found to be outstanding. The Tule Springs Hills Unit was dropped because the area had been impacted by numerous mining claims and scars, roads and ways, pipelines, and water tanks found throughout the entire unit. In addition, the unit lacked sufficient vegetative screening to adequately screen the intrusions found within the unit. The Tule Springs Hills Unit provides recreation opportunities; however, "…other areas in the vicinity offer higher quality recreation experiences." The Hollow Wash Unit was dropped from further consideration because it lacked vegetative screening and did not offer outstanding opportunities for solitude and for primitive and unconfined recreation. The Lone Mesa Unit was dropped from consideration because it lacked both naturalness and outstanding opportunities for primitive and unconfined recreation. (BLM, 1979).

3.10.1.2 Areas of Critical Environmental Concern

The Federal Land Policy Management Act of 1976 (FLPMA) requires that priority be given to the designation and protection of ACECs. An ACEC designation is the principal BLM designation for public lands where special management is required to protect important natural, cultural, and scenic resources, or to identify natural hazards.

Special Management Areas (SMAs) for desert tortoise were proposed as three ACECs by BLM in its 1999 *Proposed Caliente Management Framework Plan Amendment* (MFPA) and *Final Environmental Impact Statement for the Management of Desert Tortoise Habitat*. The three ACECs are: Kane Springs, Mormon Mesa, and Beaver Dam Slope (BLM, 1999). The Mormon Mesa and Beaver Dam Slope ACECs are located nearest to the two Toquop parcels and alignments. The Kane Springs ACEC is approximately 28 to 35 miles west of the two Toquop parcels and alignments. Maps 3-10, 3-11, and 3-12 show lands in the project area that have been designated as ACECs.

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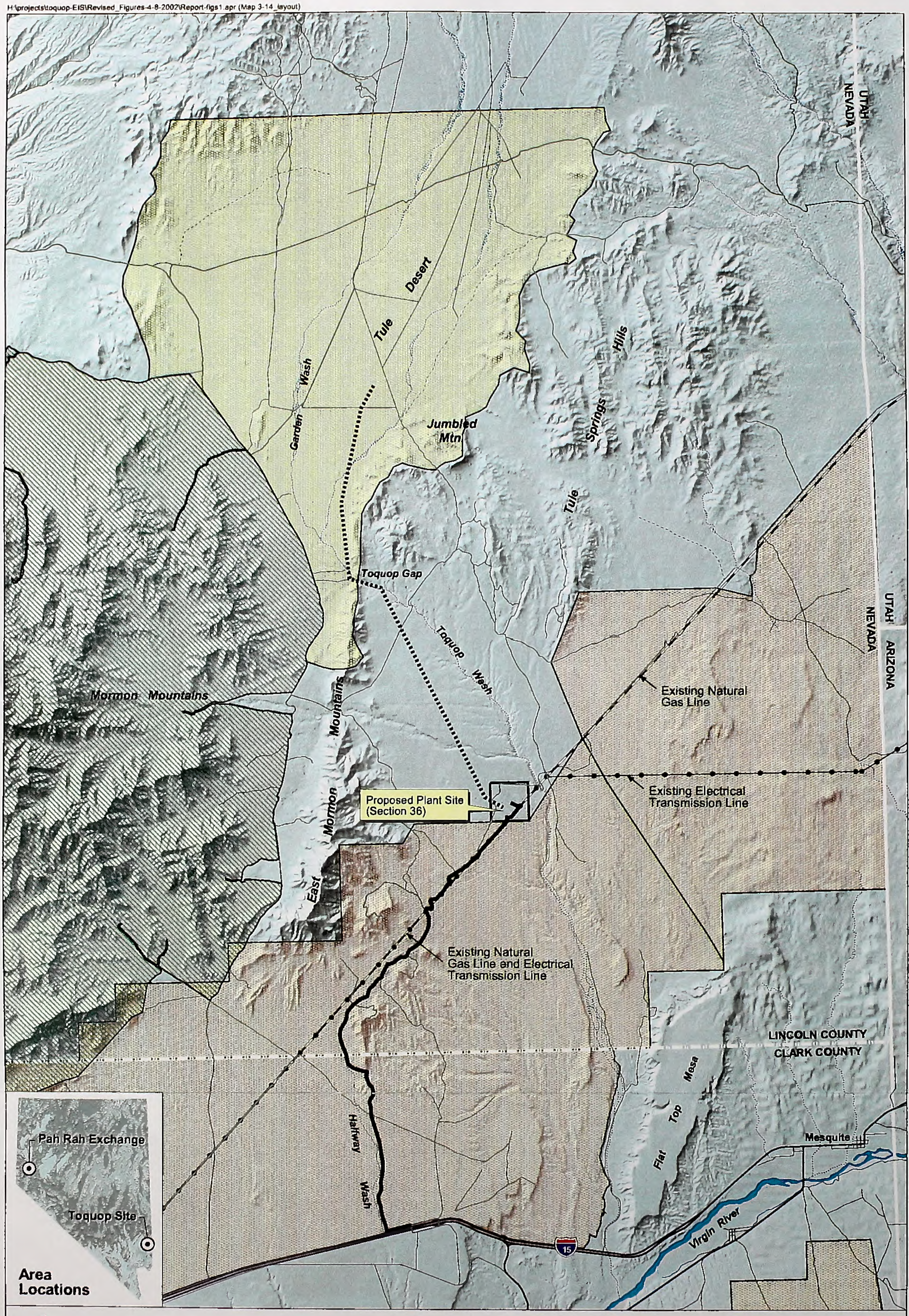


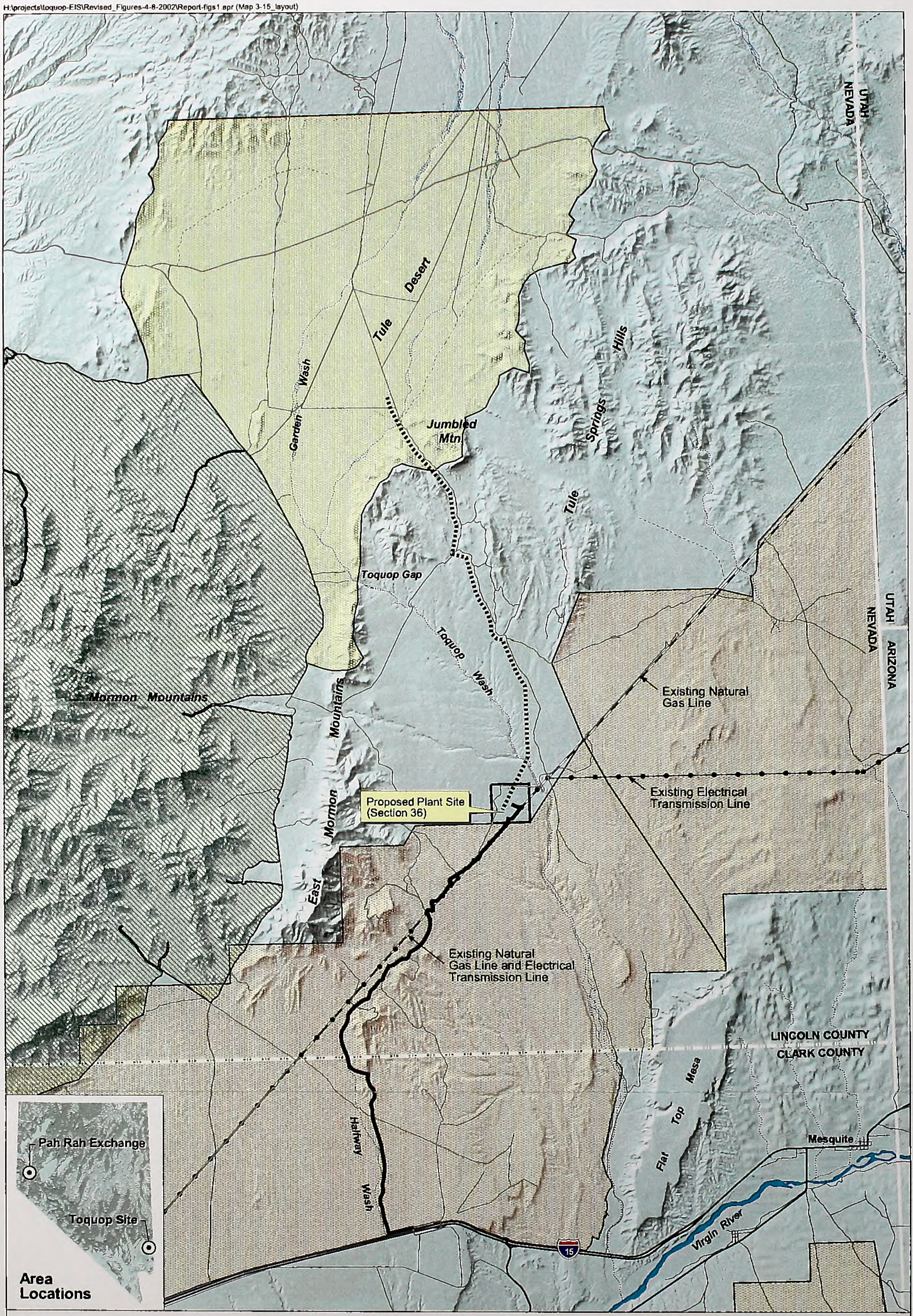
Source:
1:100,000 Vector Linework - BLM Nevada,

Toquop Energy Project
Wilderness Study Areas and ACEC
Proposed Action

Map 3-14

CH2MHILL

H:\projects\toquop-EIS\Revised_Figures-4-8-2002\Report-figs1.apr (Map 3-15_layout)



N

0 6250 12500 18750 Feet

Source:
1:100,000 Vector Linework - BLM Nevada,

Legend

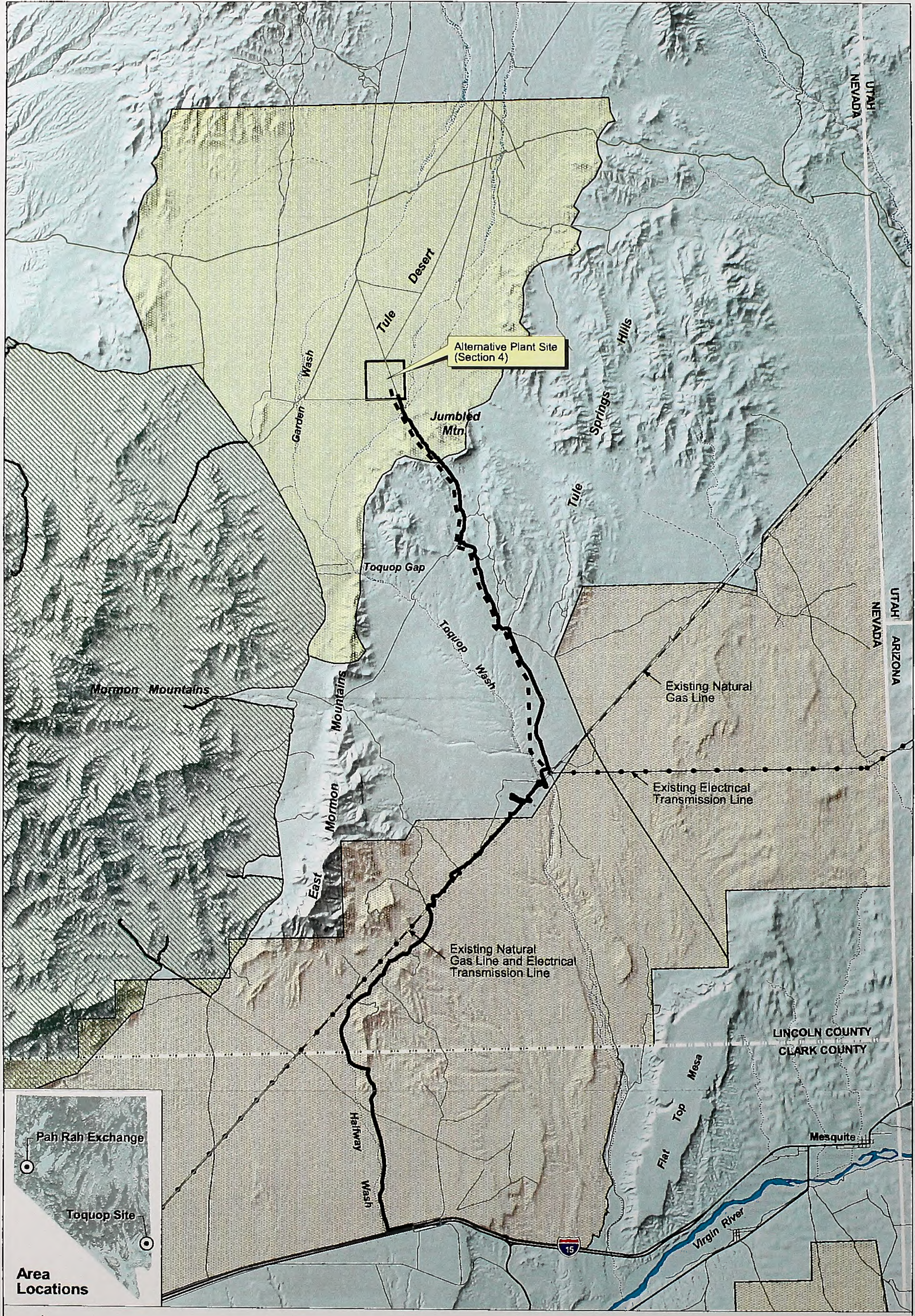
- ▨ Wellfield
- ▨ Wilderness Study Area
- ━ Access Road
- ▨ Area of Critical Environmental Concern (ACEC)
- ▪▪▪▪▪ Water Pipeline

Toquop Energy Project
Wilderness Study Areas and ACEC
Alternative 1

Map 3-15

CH2MHILL

H:\projects\toquop-EIS\Revised_Figures-4-8-2002\Report-figs1.apr (Map 3-16_layout)



N

0 6250 12500 18750 Feet

Source:
1:100,000 Vector Linework - BLM Nevada,

Legend

▨ Wellfield

▨ Wilderness Study Area

━ Access Road

▨ Area of Critical Environmental Concern (ACEC)

- - Gas Pipeline and Transmission Line

Toquop Energy Project
Wilderness Study Areas and ACEC
Alternative 2

Map 3-16

CH2MHILL

The southern Toquop parcel is not located within the Mormon Mesa ACEC, but borders it. The 14.4-mile-long access road to that parcel from the south is within the Mormon Mesa ACEC. The access road and eastern and western utility alignments (associated with the Proposed Action and two action alternatives) between the southern and northern Toquop parcels are not located within an ACEC. The Beaver Dam ACEC is approximately 0.25 to 0.5 mile east of the eastern alignments, depending on location along the alignment. The access road between the northern and southern parcels, and the eastern and western utility alignments, are located within tortoise habitat (BLM, 2001c). However, a 3.5-mile portion of the access road for Alternative 2 and a 0.5-mile portion of the utility alignment for Alternative 2 are located in FWS "critical" habitat for the desert tortoise.

The MFPA indicates that management plans would be prepared for the ACECs. The plans would include land management prescriptions with the intent of recovering the Mojave population of the desert tortoise. Management directions for the ACECs address such issues as vegetation, wildlife, grazing, wild horses, and land disposal and withdrawals. The management direction applicable to the proposed project is to grant access roads to private parcels, federal oil and gas leases, and mining claims based on NEPA analysis and Section 7 consultation.

Management direction is also proposed for desert tortoise habitat outside of the ACECs to improve that habitat and be consistent with the recovery efforts by other agencies (BLM, 1999). The FWS-designated "critical" habitat area will be adjusted to reflect BLM's ACEC areas when all applicable (all states') land use plans for desert tortoise habitat have been amended.

3.10.1.3 Wild and Scenic Rivers

On October 2, 1968, Congress created the National Wild and Scenic Rivers System. The Wild and Scenic Rivers Act (P.L. 90-542, as amended) provided for a National Wild and Scenic Rivers System, designated the initial components of that system, and prescribed methods by which, and standards according to which, additional river components may be added to the system. Rivers are either authorized for listing as wild, scenic, or recreational by an Act of Congress or are designated by an act of the legislature of the state or states through which they flow. Nevada does not have any rivers that are listed pursuant to the National Wild and Scenic Rivers System (NPS, 2001a). As of 1998, no rivers in Nevada had been designated for study (NPS, 2001b).

3.10.2 Pah Rah Parcel

3.10.2.1 Wilderness Study Areas

No Wilderness Areas or WSAs exist near the Pah Rah parcel.

3.10.2.2 Areas of Critical Environmental Concern

The BLM Carson City Field Office Consolidated Resource Management Plan (CRMP) (BLM, 2001a) identified the following three ACECs within its planning area: the Incandescent Rocks Natural Scenic Area, the Steamboat Hot Springs Buckwheat Area, and the Stewart Valley Natural Research Area. The designation for the proposed Soda Lake ACEC was abandoned because of insufficient public lands. In 2001, the Southern Washoe

County Urban Interface Plan Amendment identified the following three additional ACECs: the Carson Wandering Skipper Area, the Pah Rah High Basin (Dry Lakes) Petroglyph District, and the Virginia Range Williams Combleaf Habitat Area. The Pah Rah parcel is located approximately 9.5 miles east of the Pah Rah High Basin (Dry Lakes) Petroglyph District ACEC (BLM, 2001a).

3.10.2.3 Wild and Scenic Rivers

As discussed above, no rivers in Nevada are listed pursuant to the National Wild and Scenic Rivers System (NPS, 2001a), and, as of 1998, no rivers in Nevada had been designated for study (NPS, 2001b).

3.11 Wastes, Hazardous and Solid

This section discusses solid and hazardous materials as they relate to the Proposed Action and the alternatives. Sites with known or suspected waste releases may be affected by a proposed project. Therefore, the Toquop area and Pah Rah parcel were evaluated to assess environmental conditions relative to the presence of solid or hazardous wastes. No solid or hazardous wastes are currently being generated within the Toquop area or the Pah Rah parcel, and no historic solid or hazardous waste sites were identified for these areas.

3.11.1 Toquop Area

A Phase I Environmental Site Assessment of the southern Toquop project area was prepared (Resource Concepts, Inc., 2001a). The investigation included the following activities:

- Review of ownership records and maps
- Review of site natural history
- Interviews with current owner's representative
- Review of federal, state, local, and additional environmental regulatory records
- Site reconnaissance

The southern Toquop parcel is currently uninhabited; development is limited to a series of dirt roads and five utility corridors (easements). The primary road generally follows the utility corridor. A secondary road departs from the utility corridor just southwest of the property, passes through the west and north portions of the parcel, and joins with the utility corridor road just outside of the northeast corner of the Toquop parcel. The utility easements that traverse the Toquop parcel include three transmission lines, a buried natural gas line, and a buried fiber optic cable. The Gourd Springs Mining District is located west and north of the Toquop parcel.

The environmental site assessment also included the results of a search of EPA's Envirofacts database to determine whether the southern or northern Toquop parcels, or any properties within a 1-mile radius including utility corridors and the wellfield, have had chemical releases, water discharges, hazardous waste handling operations, or are sites with Superfund status. In addition, State records from the NDEP and local records from the Mesquite Fire and Rescue Department were reviewed. No issues of concern related to hazardous or solid waste were identified for the Toquop project area.

3.11.2 Pah Rah Parcel

A Phase I Environmental Site Assessment of the Pah Rah parcel was prepared (Resource Concepts, Inc., 2001b). The environmental site assessment included the same investigative activities as described for the Toquop area.

The Pah Rah parcel is APN 84-040-12, described as Section 9, T20N, R23E. The parcel is located atop a mesa at the southern end of the Pah Rah mountain range in Washoe County, Nevada. The parcel is uninhabited, with no development other than minor activity related to surveying. Virtually no improvements exist on the Pah Rah parcel other than survey markers. Small amounts of airborne litter were found at various locations on top of the mesa.

A transmission line corridor runs from the southwest to the northeast along the canyon west and north of the Pah Rah parcel. North of the parcel are a series of dirt roads, two transmission lines, and Olinghouse Mine. An old railroad grade extends between Wadsworth (east of the property) and Olinghouse Mine (northeast of the property). To the south, between the parcel and the Truckee River, are a buried pipeline, a transmission line, I-80, and a railroad corridor.

No issues of concern related to hazardous or solid waste were identified.

3.12 Cultural and Historical Resources and Native American Religious Concerns

3.12.1 Toquop Area

The Toquop area is in the Mojave Desert where humans have lived for approximately 12,000 years, mostly as mobile hunter-gatherers (Lyneis, 1982; Willeg and Aikens, 1988). Early Paleoindian groups focused more heavily on large game than later Archaic peoples who put greater emphasis on plant resources, as evidenced by an increasing profusion of, and sophistication in, ground-stone technology through time. The archaeological record indicates that over the past 8,000 years, increasing Archaic population density in the Great Basin pressured people into more restricted mobility, diverse diet breadth, and rigorous seasonal resource scheduling (Fowler and Madsen, 1986).

Virgin River and Muddy River Anasazi settlements, which developed approximately 300 A.D., broke from the strict hunter-gatherer lifeway typical of the rest of the Great Basin (Fowler and Madsen, 1986). These groups were more sedentary, living in pit-houses overlooking horticultural fields near the rivers. Still, use of surrounding lands, such as the Toquop Wash area, probably remained similar to that of earlier groups, even if less intensive. At approximately 1,000 to 1,200 years ago, a rapid population decline occurred in the area and, again, hunter-gatherer groups occupied the area. Considerable debate exists as to the nature of this shift and whether it represents a simple change in settlement-subsistence pattern (a byproduct of climatic change), or replacement of Anasazi peoples by Numic-speaking groups expanding from the southeast California area (Fowler and Madsen, 1986; Madsen and Rhode, 1994). By the ethnographic present, the project area was inhabited by the Southern Paiute, but closely neighbors Mohave and Walapai lands to the south and Shoshone territory to the northwest.

The generally rugged terrain and lack of mineral resources has resulted in little historical use of the project vicinity (Sterner and Ezzo, 1996; White et al., 1991). Transportation has typically followed the more amenable landscape through the Virgin Valley, and mining interests have been limited to small-scale operations in surrounding areas. Mormon interest in the region began in the mid-nineteenth century, particularly in the Virgin River and Muddy River valleys where farming and ranching were possible. Springs, such as Abe Spring and Tule Spring located near the proposed eastern pipeline alignment, were used historically as watering holes for cattle.

Cultural resources work was conducted to comply with Federal law as required by the National Historic Preservation Act (NHPA) of 1966, as amended through 2000, the Native American Graves Protection and Repatriation Act (NAGPRA) of 1990, and the American Indian Religious Freedom Act (AIRFA) of 1978. Cultural resource permits required for the proposed project consist of a BLM Cultural Resource Use Permit, and a Nevada state curation agreement.

All cultural resources work was carried out according to the stipulations of a Programmatic Agreement (contained in *Appendix C, Cultural Resources Programmatic Agreement*) between the BLM, SHPO, and Toquop Energy for the Toquop Energy Project regarding the identification and treatment of historic properties. A Class III inventory, as defined in the BLM's (1990) cultural resource guidelines, was conducted for the linear portions of the Proposed Action and alternative project features to identify cultural resources. After prior consultation with, and concurrence of Nevada SHPO, Class II inventories were conducted for both the southern power plant site (for the Proposed Action and Alternative 1) and the northern alternative site (for Alternative 2). A Class I literature review and site files search was conducted for the wellfield area at the Harry Reid Center for Environmental Studies; specific well locations within this area will be inventoried at the Class III level once their final location and access routes are determined.

Thirty-four cultural resources sites and 10 isolated artifacts are known within the 1-mile study radius designated for review, although most are outside the ROWs. These are summarized in Table 3-5. Prehistoric sites include flaked stone scatters, roasting pits, rockshelters, and rock alignments in addition to isolated artifacts. Historic period sites include one pioneer burial, a telephone line, roads, and debris deposits, in addition to isolates. Some sites contain prehistoric and historic components. Thirty-six archaeological reports on previous work in the project vicinity were consulted during literature review. Further details regarding the sites and relevant literature will be contained in the pending stand-alone archaeological report, BLM report number NV-04-02-1376b.

TABLE 3-5
Archaeological Sites and Isolated Artifacts within 1 Mile of the Proposed Action and Alternatives

Category	NRHP* Eligible	Not NRHP Eligible
Prehistoric	7	19
Historic	3	2
Prehistoric/Historic	0	3
Isolate	0	10

*NRHP=National Register of Historic Places

Information relating to Native American concerns comes from two sources: existing ethnographic reports and data collection resulting from both the earlier land exchange proposal (the southern power plant site of the Proposed Action now incorporated as part of the Toquop Energy Project) and data collection done in relation to the Toquop Energy Project specifically. The BLM has initiated consultation with the following Paiute Indian Tribes: the Moapa Band of Paiutes (Nevada), the Paiute Indian Tribe of Utah, the Shivwits Band (Utah), the Las Vegas Paiute Tribe (Nevada), and the Kaibab Paiute Tribe (Arizona)—and informed one other tribal member as requested by the Paiute Indian Tribe of Utah of the proposed land exchange involving the Toquop parcel. The Moapa Band of Paiutes, Shivwits Band (Utah), and the Paiute Indian Tribe of Utah responded. The Las Vegas Paiute Tribe declined involvement, and no other responses were received. The responding tribes made on-site visits. All expressed concern that a property of traditional cultural or religious importance, the Salt Song Trail, might be affected, and the Moapa Band identified the trail as a sacred site. No "Indian plants" were mentioned or identified. Two tribes expressed concern for preservation of the archaeological resources. Subsequent data gathering has resulted in expressions of no concern for the Toquop Energy Project from both the Paiute Tribe of Utah and the Las Vegas Paiute Tribe. The Shivwits Band retains its concern for the preservation of all prehistoric archaeological resources; they indicated that its tribal members do not believe the Salt Song Trail extended into the project area after making a field visit to the area. Efforts continue to obtain information from the Moapa Band of Paiutes and from the Kaibab Paiute Tribe regarding the Toquop Energy Project.

Ethnographic information includes comments from Indian tribes and individuals (Stoffle et al., 1983) made in relation to construction of one of the existing electrical transmission lines that pass through the southern power plant site alternative. Various property types were established and then ranked by Indian participants as to their degree of concern for preservation of the property type. For example, trails were ranked ninth among eleven categories, although the level of concern was relatively high across all categories; the Salt Song Trail is not mentioned specifically by Stoffle et al. (1983).

Several geographic features were ranked by Indian participants as to their levels of concern; those relevant to the project area are the Toquop Wash, Tule Springs Hills, Halfway Wash, Davidson Peak, and the East Mormon Mountains. Stoffle et al. (1983:91) state that "meanings" are attached to the named places, but those meanings are neither identified specifically nor amplified. One other place contained rockshelters, possibly other physical features, as well as various plants that were of concern to Native Americans (Stoffle et al., 1983:Tables 43, 44). Mitigation was suggested in several forms, including presence of a representative of the Moapa Band of Paiutes during groundbreaking activity, and consultation with Indian tribes concerning archaeological sites and "disposition of stands of Indian plants" (Stoffle et al., 1983:183).

No rockshelters or prehistoric or ethnohistoric archaeological sites were identified during the cultural resources inventory in this area of concern to Native Americans. No tribe has provided information as to a definite location of the Salt Song Trail relative to the Proposed Action or alternatives, or as to how religious practitioners would be affected by these actions. As noted previously, at least one tribe does not think the Salt Song Trail extends into the area of the Toquop Energy Project, and two others have expressed no concerns for the proposals.

3.12.2 Pah Rah Parcel

The general description of the cultural background for the Toquop area also applies to the Pah Rah parcel. However, by the ethnographic present, the Pah Rah parcel was within an area inhabited by the Northern Paiute, but closely neighbors traditional Washoe lands to the west.

The Pah Rah parcel is near the Truckee River and the Truckee Meadows, which were central to historic mining and logging transportation. A major east-west travelway leading west to nearby Reno, Nevada, has been in place since the mid-nineteenth century.

A Class II inventory, as defined in the State Protocol Agreement between the BLM and Nevada SHPO, was conducted for the Pah Rah parcel to identify cultural resources and assess cultural resource value. Consultation with Native American Tribes has been completed. The BLM consulted with the Pyramid Lake Paiute Tribe, the Washoe Tribe of Nevada and California, and the Reno-Sparks Indian Colony regarding the proposed land exchange and the Pah Rah parcel. No concerns were identified.

The Class II inventory and site file search identified several archaeological sites and a number of isolated artifacts or features (Table 3-6). Site types include rock features (most without associated artifacts) and an historic debris scatter. One site is NRHP eligible, while most are unevaluated. Most of these sites will require subsurface excavation to complete assessment, and one requires further consultation with appropriate Indian tribes to complete evaluation. One historic period site was determined not eligible due to its ambiguity of historic context. None of the isolates are eligible for inclusion to the NRHP. Eight cultural resources reports relevant to the parcel were reviewed.

TABLE 3-6
Archaeological Sites and Isolated Artifacts in the Pah Rah Parcel

Category	NRHP* Eligible	Not NRHP Eligible	Unevaluated
Prehistoric	1	0	5
Historic	0	1	0
Isolate	0	14	0

*NRHP=National Register of Historic Places

The BLM initiated consultation with the Pyramid Lake Paiute Tribe, the Washoe Tribe of Nevada and California, and the Reno-Sparks Indian Colony regarding the Pah Rah parcel. Two tribes made trips and visual inspections without actually entering the parcel. The visit by the Washoe Tribe included a field inspection by a tribal elder that examined one of the archaeological sites and concluded it was likely a spiritual location used by a medicine person, although the age, function, and purpose are unknown. This site will be managed as an "unevaluated" cultural resource pending accumulation of additional information regarding NRHP eligibility, recent use, access, etc.

3.13 Indian Trust Assets

Indian Trust Assets (ITAs) are legal interests in assets held in trust by the federal government for Indian Tribes or individuals. The Department of the Interior Order No. 3175 requires all its bureaus and offices to explicitly address anticipated effects on ITAs in planning, decision, and operation documents.

3.13.1 Toquop Area

According to surface land management status maps, Bureau of Indian Affairs (BIA), and BLM records, no Native American asset claims have been identified in the Toquop area.

3.13.2 Pah Rah Parcel

According to surface land management status maps and the BIA and BLM, no Native American asset claims have been identified on the Pah Rah parcel.

3.14 Environmental Justice

Title VI of the 1964 Civil Rights Act and Executive Order (E.O.) 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations*, was signed on February 11, 1994. Federal agencies are required by E.O. 12898 to address disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations. The intent is that no person in the United States shall, on the basis of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving federal financial assistance.

The following sections discuss the population, per capita income, and breakdown of race descriptive for the Toquop area and the Pah Rah parcel. The counties considered for the Toquop area are Clark and Lincoln; the county considered for the Pah Rah parcel is Washoe.

3.14.1 Toquop Area

Table 3-7 presents demographic data for Clark and Lincoln counties. Per capita income in Clark County was $26,212. Per capita income in Lincoln County was $18,448. Clark County's poverty rate was 11.1 percent. Lincoln County's poverty rate was 14.8 percent.

Lincoln County contains eight census block groups. No census block groups in Lincoln County have low-income or minority communities (BLM, 1999). No low-income or minority communities exist on, adjacent to, or in the vicinity of the Toquop area.

3.14.2 Pah Rah Parcel

Table 3-7 also presents demographic data for Washoe County. Per capita income in Washoe County was $30,214. Washoe County's poverty rate was 9.8 percent. No low-income or minority populations exist on or adjacent to the Pah Rah parcel. Some residents of the Pyramid Lake Indian Reservation reside less than 5 miles east of the parcel in the Wadsworth area.

3.15 Paleontological Resources

3.15.1 Toquop Area

Local geologic maps and literature were assessed for the potential of paleontological resources in the Toquop area. According to the Lincoln County geologic maps, the project areas for the Proposed Action, Alternative 1, and Alternative 2 are within old alluvial gravels cemented together by calcium carbonate (Tschanz and Pampayan, 1970). The *Environmental Assessment for the Lincoln County Land Act of 2000* reported fossil-bearing strata east of the project area (also see Livingston, 2001), particularly in the Badland soil series. Badland soils occur along approximately 1.25 miles of the access road (Bagley et al., 1980). The Kern River 2003 Expansion Project reported significant fossils in Quaternary sediments and soils of the Muddy Creek Formation along the access road (Dames & Moore, 1990b and 1992). However, no paleontological resources were identified in a pedestrian survey of this area.

3.15.2 Pah Rah Parcel

Local geologic maps and literature were assessed for the potential of paleontological resources in the Pah Rah parcel. According to the Washoe County geologic maps, the Pah Rah Range consists of volcanic and non-marine sedimentary rocks. No paleontological resources are known to occur in the Pah Rah parcel.

3.16 Socioeconomics

This section describes the existing social and economic conditions within Clark, Lincoln, and Washoe counties. These variables include employment, population, housing, and community infrastructure.

TABLE 3-7
Demographic Data for Clark and Lincoln Counties

County	Total Population[a]	Per Capita Income[b]	Race (Percentage of Total Population)[a]
Clark County			
	1,375,765 in 1999	$26,212 in 1997	Caucasian (71) African American (9) American Indian (1) Asian (5) Native Hawaiian (1) Other Race (13)
Lincoln County			
	4,165 in 1999	$18,448 in 1997	Caucasian (91) African American (2) American Indian (2) Asian (1) Native Hawaiian (0) Other Race (4)
Washoe County			
	339,486 in 1999	$30,214 in 1997	Caucasian (80) African American (2) American Indian (2) Asian (4) Native Hawaiian (1) Other Race (11)
Poverty Rate[b]			
Clark County: 11.1% in 1997 Lincoln County: 14.8% in 1997 Washoe County: 9.8% in 1997			

Notes:

"American Indian" includes Alaska Native.
"Asian" includes Asian Indian, Chinese, Filipino, Japanese, Korean, Vietnamese, and Other Asian.
"Native Hawaiian" includes Native Hawaiian, Guamanian or Chamorro, Samoan, and Other Pacific Islander.
"Other Race" does not indicate the specific race.

Sources:

[a] http://factfinder.census.gov. Bureau of the Census, 2001 (1999 data).
[b] http://www.fedstats.gov (1997 data).

Clark and Lincoln counties comprise the region of influence for potential economic impacts. This two-county area was determined to be the impact region because the proposed project features would be located in Lincoln County, but the project construction and operation workforce could be expected to come from Clark and Lincoln counties. Therefore, economic effects resulting from the project would likely primarily occur in these counties. Effects could occur to other surrounding counties, or counties in other regions of the United States, depending on where project facility components are manufactured. These effects are impossible to determine. For that reason, this analysis is limited to Clark and Lincoln counties. Economic impacts on Washoe County are discussed qualitatively because no facilities are proposed for development on the Pah Rah parcel.

Because of the nature of the Proposed Action and the remoteness of the project sites, the area of influence for community infrastructure is limited to the project sites, the proposed utility alignments, and the immediately adjacent lands.

3.16.1 Toquop Area

3.16.1.1 Population

Clark County is the most populous of the 17 counties in Nevada with an estimated total population of 1,425,723 in 2000. During this year, Clark County accounted for about 69 percent of the total state population of 2,066,831. The five incorporated cities in the county: Boulder City, Henderson, Las Vegas, Mesquite and North Las Vegas comprise almost 60 percent of the county's 2000 population. The City of Mesquite, the incorporated city in Clark County that is closest to the project site, had a population estimate at 15,605 in 2000. In 1990, the Clark County population was estimated to be 770,280 (Nevada State Demographer's Office, 2001). The total increase in population during the 10-year period from 1990 to 2000 was approximately 58 percent, with an average annual growth rate of 6.3 percent. The Nevada State Demographer's Office predicts this annual rate of growth will decrease substantially during the period of 1999 to 2010 to an average rate of 2.8 percent (Nevada State Demographer's Office, 2000). In-migration by retirees and those seeking employment in the services sector of the economy continues to be the primary influence on Clark County population growth.

Lincoln County is rural and sparsely populated. In 2000, the estimated population was 4,420 (up 16 percent from the 1990 population estimate of 3,810). This represents an average annual growth rate of 1.5 percent. The State Demographer's Office predicts this average annual growth rate will decline to 0.1 percent during the period of 1999 to 2010. Lincoln County has just one incorporated city, Caliente, with a 2000 population of 1,132. The three unincorporated towns, Alamo, Panaca and Pioche had a total 2000 population of 2,040. Combined, these three towns and the City of Caliente made up about 70 percent of the County population in 2000 (Nevada State Demographer's Office, 2000 and 2001). Out-migration of young people seeking education and employment, and in-migration of retirees are the primary factors shaping Lincoln County population trends.

3.16.1.2 Employment

The Bureau of Economic Analysis (BEA), Regional Economic Information System (REIS) reported a Clark County employment of 815,718 for the year 1999. Table 3-8 lists Clark County employment by industry, along with percentages of total employment. The services industry (which includes hotels, gaming, tourism entertainment, and recreation) accounts for 44 percent of the county employment. Retail trade is the next most important industry in terms of employment accounting for 16 percent of county's jobs.

Table 3-9 shows the 1999 employment estimates for Lincoln County as reported by the BEA REIS. The government and government enterprises account for 30 percent of the total county employment with retail trade accounting for another 16 percent of the total employment.

TABLE 3-8
1999 Clark County Total Full- and Part-Time Employment by Industry

	Jobs	% of Total
County Total	815,718	
Farm employment	338	0.0%
Non-farm employment	815,380	100.0%
Ag. serv., forestry, fishing, and other	8,572	1.1%
Mining	1,467	0.2%
Construction	77,558	9.5%
Manufacturing	21,586	2.6%
Transportation and public utilities	39,924	4.9%
Wholesale trade	24,311	3.0%
Retail trade	131,648	16.1%
Finance, insurance, and real estate	72,149	8.8%
Services	362,463	44.4%
Government and government enterprises	75,702	9.3%
Federal, civilian	8,607	1.1%
Military	9,068	1.1%
State and local	58,027	7.1%
State	11,578	1.4%
Local	46,449	5.7%

Source: BEA REIS, 2002

TABLE 3-9
1999 Lincoln County Total Full- and Part-Time Employment by Industry

	Jobs	% of Total
County Total	2,000	100.0%
Farm employment	149	7.5%
Non-farm employment	1,851	92.6%
Ag. serv., forestry, fishing, and other	D	
Mining	37	1.9%
Construction	44	2.2%
Manufacturing	D	
Transportation and public utilities	62	3.1%
Wholesale trade	D	
Retail trade	319	16.0%
Finance, insurance, and real estate	92	4.6%
Services	D	
Government and government enterprises	607	30.4%
Federal, civilian	35	1.8%
Military	L	
State and local	564	28.2%
State	155	7.8%
Local	409	20.5%

Source: BEA REIS, 2002
D = Estimate not shown to avoid disclosure of confidential information; estimate included in non-farm total
L = Estimate less than $50,000 or less than 10 jobs; estimate included in non-farm total

3.16.1.3 Unemployment

Between 1990 and 2001, the average annual unemployment rate in Clark County has ranged from a high of 7.1 percent in 1993 to a low of 4.0 percent in 1997. In 2001, the average annual unemployment rate was 5.5 percent. In general, the Clark County unemployment rate for the period of 1990 to 2001 has been slightly lower than the state averages, which had a range of 4.1 percent in 1997 and a high of 7.2 in 1993 (Nevada Department of Employment, Training and Rehabilitation, 2002).

For Lincoln County, the unemployment rate is generally higher than the state average. During the period between 1990 and 2001, Lincoln County had a maximum unemployment rate of 11.9 percent in 1995 and a low of 6.1 percent in 1999. In 2001, the average annual unemployment rate was 7.2 percent (Nevada Department of Employment, Training and Rehabilitation, 2002).

3.16.1.4 Earnings and Income

Per capita income in Clark County in 1989 was $15,109 (Bureau of the Census, 1991); in 1997, it was $26,212. Total personal income in Clark County in 1997 was $29,013,523,000 (FedStats, 2001). Table 3-10 shows the place of work earnings by industry for the year 1999 as reported by the BEA REIS. The services industry accounts for 42 percent of the county earnings, followed by government and government services with about 13 percent, and the construction industry with about 12 percent of the place of work earnings.

TABLE 3-10
1999 Clark County Place of Work Earnings by Industry

	Place of Work Earnings ($)	% of Total
County Total	28,047,163	
Farm Earnings	7,841	0.0%
Non-farm Earnings	28,039,322	100.0%
Ag. Serv., forestry, fishing, and other	193,404	0.7%
Mining	40,005	0.1%
Construction	3,347,301	11.9%
Manufacturing	826,733	2.9%
Transportation and public utilities	1,592,680	5.7%
Wholesale trade	1,034,457	3.7%
Retail trade	2,778,812	9.9%
Finance, insurance, and real estate	2,707,802	9.7%
Services	11,902,591	42.4%
Government and government enterprises	3,615,537	12.9%
Federal, civilian	552,532	2.0%
Military	367,317	1.3%
State and local	2,695,688	9.6%
State	475,180	1.7%
Local	2,220,508	7.9%

Source: BEA REIS, 2002

Per capita income in Lincoln County in 1989 was $9,074 (Bureau of the Census, 1991); in 1997, it was $18,448. Total personal income in Lincoln County in 1997 was $76,227,000 (FedStats, 2001).

Table 3-11 shows the Lincoln County place of work earnings by industry for the year 1999 as reported by the BEA REIS. The government and government services industry accounts for almost 40 percent of the County earnings.

TABLE 3-11
1999 Lincoln County Place of Work Earnings by Industry

	Place of Work Earnings ($)	% of Total
County Total	58,616	
Farm Earnings	564	1.0%
Non-farm Earnings	58,052	99.0%
Ag. serv., forestry, fishing, and other	D	
Mining	938	1.6%
Construction	858	1.5%
Manufacturing	D	
Transportation and public utilities	3,138	5.4%
Wholesale trade	D	
Retail trade	3,649	6.2%
Finance, insurance, and real estate	1,210	2.1%
Services	D	
Government and government enterprises	22,974	39.2%
Federal, civilian	1,809	3.1%
Military	112	0.2%
State and local	21,053	35.9%
State	7,896	13.5%
Local	13,157	22.4%

Source: BEA REIS, 2002
D = Estimate not shown to avoid disclosure of confidential information; estimate included in non-farm total

3.16.1.5 Tax Receipts

Clark County's fiscal year (FY) 1999-2000 taxable sales were $21.2 billion. Based on a sales and use tax rate of 7.25 percent, the estimated sales tax generated in FY 1999-2000 was $1.5 billion (Nevada Department of Taxation, 2001). The total assessed value of property in the county (35 percent of the taxable value) for FY 1999-2000 was $30.5 billion. Projected property tax revenue for the county was $906.2 million, resulting in an average property tax rate of 2.967 percent (Nevada Department of Taxation, 1999).

Lincoln County's FY 1999-2000 taxable sales were $25.2 million. Based on a sales and use tax rate of 6.75 percent, the estimated sales tax generated in FY 1999-2000 was $1.7 million (Nevada Department of Taxation, 2001). The total assessed value of Lincoln County properties was $82.6 million in FY 1999-2000. Projected property tax revenue for the county was $2.3 million, resulting in an average property tax rate of 2.832 percent (Nevada Department of Taxation, 1999).

3.16.1.6 Housing

The 2000 Census reports that the total number of housing units in Clark County was 559,799. Of this total, 512,253 units were occupied, with a corresponding vacancy rate of 8.5 percent. The percentage of owner-occupied units was 59.1; the percentage of renter-occupied units was 40.9. The average household size was 2.65 persons (Bureau of the Census, 2001).

The 2000 Census reports that the total number of housing units in Lincoln County was 2,178. Of this total, 1,540 units were occupied, with a corresponding vacancy rate of 29.3 percent. The percentage of owner-occupied units was 75.1; the percentage of renter-occupied units was 24.9. The average household size was 2.48 persons (Bureau of the Census, 2001).

The nearest residential communities are the cities of Mesquite in Clark County, approximately 12 miles from the southern Toquop site, and Caliente in Lincoln County. This is the only incorporated city in Lincoln County and is about 50 miles north of the southern Toquop site.

3.16.1.7 Community Infrastructure

3.16.1.7.1 Education. The southern Toquop parcel, northern Toquop parcel, wellfield, and associated utility alignment corridors are undeveloped lands. No schools are located in the project area. The nearest schools are in Mesquite.

3.16.1.7.2 Police Protection. The southern Toquop parcel, northern Toquop parcel, wellfield, and associated utility alignment corridors are undeveloped lands. No police protection facilities are located in the project area. BLM enforcement has one officer assigned to this area.

The Lincoln County Sheriff's Department provides law enforcement services to Lincoln County, including the Toquop area. The department has 16 personnel, 10 of which are patrol deputies. Two sheriff stations, one in Alamo and the other in Pioche, are located in the county. The response time to the Toquop area from the Pioche station is approximately 2 hours (Bradfield, 2001). The nearest law enforcement center is Mesquite in Clark County.

3.16.1.7.3 Fire Protection. The southern Toquop parcel, northern Toquop parcel, wellfield, and associated utility alignment corridors are undeveloped lands. No fire protection facilities are located in the project area.

The nearest fire station to the Toquop area is in Mesquite. Lincoln County has four fire fighting stations, each with an engine and ambulance. The stations are located in Alamo, Caliente, Panaca, and Pioche. All four stations are manned by volunteer firefighters. The dispatch for the four stations is handled through the sheriff's department in Pioche. The Lincoln County station nearest the Toquop area is in Alamo, and the response time to the area is approximately 2 hours (Bradfield, 2001). BLM has a fire fighting station in Caliente and an agreement with the Las Vegas BLM office that would allow the fire station in Mesquite to respond to fires in southern Lincoln County. The Mesquite station would have an approximate 30-minute response time, utilizing Type 3 engines.

3.16.1.7.4 Hospitals and Medical Care. The southern Toquop parcel, northern Toquop parcel, wellfield, and associated utility alignment corridors are undeveloped lands. No medical facilities are located in the project area. The 137-bed Dixie Regional Medical Center is in St. George, Utah, approximately 35 miles east of Mesquite. The Grover Dills Hospital, a 20-bed facility owned by Lincoln County, is in Caliente about 45 miles from the site.

3.16.1.7.5 Water and Wastewater. The southern Toquop parcel, northern Toquop parcel, wellfield, and associated utility alignment corridors are undeveloped lands. No municipal or industrial water or wastewater facilities are located in the project area.

3.16.1.7.6 Natural Gas. The southern Toquop parcel, northern Toquop parcel, wellfield, and associated utility alignment corridors are undeveloped lands. The 36-inch Kern River Gas Pipeline crosses the southeast corner of the southern Toquop parcel.

3.16.1.7.7 Telephone. The southern Toquop parcel, northern Toquop parcel, wellfield, and associated utility alignment corridors are undeveloped lands. The Touch America, Inc. (Williams Communications) fiber optic communication cable crosses the southeast corner of the southern Toquop parcel along the southeast side of the natural gas line. No telephone facilities are located in the project area. The Toquop area is in the service area of Lincoln County Telephone.

3.16.1.7.8 Electricity. The northern Toquop parcel is undeveloped. Three overhead electric transmission lines cross the southern Toquop parcel. Easements are granted for one transmission line to the Bureau of Reclamation, City of Los Angeles, and Nevada Power Company. A second transmission line is owned by the Intermountain Power Project. The third transmission line is owned by Nevada Power Company (Resource Concepts, Inc., 2001). The Toquop area is in the service area of the Lincoln County Power District.

3.16.2 Pah Rah Parcel

3.16.2.1 Population

Although Southern Washoe County contains the urbanized Reno Metropolitan Statistical Area (MSA), the majority of the county's land area is sparsely settled and rural in character. The County is the second most populated (behind Clark County) with a 2000 population estimate of 333,566. This represents nearly a 30 percent increase from the 1990 population of 257,120, resulting in an annual average growth rate of 2.6 percent. The State Demographer's office predicts the county's growth rate will slow to 1.7 percent per year for the period between 1999 and 2010. The incorporated cities of Reno and Sparks account for almost 75 percent of the county population.

3.16.2.2 Employment

The BEA REIS reported a Washoe County employment of 231,950 for the year 1999. Table 3-12 lists Washoe County employment by industry along with percentages of total employment. The services industry (which includes hotels, gaming, tourism entertainment, and recreation) accounts for 40 percent of the county employment. Retail trade is the next most important industry in terms of employment accounting for 15 percent of the county jobs.

TABLE 3-12
1999 Washoe County Employment by Industry

	Total Full- and Part-Time Employment (jobs)	% of Total
County Total	231,950	
Farm employment	686	0.3%
Non-farm employment	231,264	99.7%
Ag. serv., forestry, fishing, and other	2,000	0.9%
Mining	891	0.4%
Construction	17,063	7.4%
Manufacturing	14,151	6.1%
Transportation and public utilities	13,290	5.7%
Wholesale trade	12,888	5.6%
Retail trade	35,903	15.5%
Finance, insurance, and real estate	21,314	9.2%
Services	91,385	39.4%
Government and government enterprises	22,379	9.6%
Federal, civilian	3,156	1.4%
Military	676	0.3%
State and local	18,547	8.0%
State	6,053	2.6%
Local	12,494	5.4%

Source: BEA REIS, 2002

3.16.2.3 Unemployment

Between 1990 and 2001, the average annual unemployment rate in the Reno MSA (Washoe County) has ranged from a high of 6.5 percent in 1993 to a low of 3.0 percent in 2000. In 2001, the average annual unemployment rate was 5.5 percent. In general, the Reno MSA unemployment rate for this period has been about 0.5 percent lower than the State average, which had a range of 4.1 percent in 1997 and a high of 7.2 percent in 1993 (Nevada Department of Employment, Training and Rehabilitation, 2002).

The annual average unemployment rate in Washoe County in 1991 was 5.0 percent; in 2000, it was 3.0 percent. In 2001, the average rate through August was 3.9 percent (Bureau of Labor Statistics, 2001).

3.16.2.4 Earnings and Income

Per capita income in Washoe County in 1989 was $16,365 (Bureau of the Census, 1991); in 1997, it was $30,214. Total personal income in Washoe County in 1997 was $9,261,636,000 (FedStats, 2001). Table 3-13 shows the place of work earnings by industry for the year 1999 as reported by the BEA REIS. The services industry accounts for 36 percent of the county earnings, followed by government and government services with about 14 percent, and retail trade with about 10 percent of the total county place of work earnings.

3.16.2.5 Tax Receipts

Washoe County's budget is $455 million, of which approximately 50 percent is referred to as the general fund. Almost 80 percent of the general fund is from sales tax (41 percent) and property tax (38 percent) revenues (Washoe County, 2001).

3.16.2.6 Housing

The 2000 Census indicates that the total number of housing units in Washoe County was 143,908. Of this total, 132,084 units were occupied, with a corresponding vacancy rate of 8.2 percent. The percentage of owner-occupied units was 59.3; the percentage of renter-occupied units was 40.7. The average household size was 2.53 persons (Bureau of the Census, 2001).

TABLE 3-13
1999 Washoe County Place of Work Earning by Industry

	Place of Work Earnings ($)	% of Total
County Total	7,852,487	
Farm employment	2,582	0.0%
Non-farm employment	7,849,905	100.0%
Ag. serv., forestry, fishing, and other	40,568	0.5%
Mining	49,710	0.6%
Construction	734,145	9.3%
Manufacturing	605,655	7.7%
Transportation and public utilities	585,288	7.5%
Wholesale trade	547,560	7.0%
Retail trade	766,609	9.8%
Finance, insurance, and real estate	593,710	7.6%
Services	2,821,548	35.9%
Government and government enterprises	1,105,112	14.1%
Federal, civilian	206,104	2.6%
Military	10,574	0.1%
State and local	888,434	11.3%
State	338,796	4.3%
Local	549,638	7.0%

Source: BEA REIS, 2002

3.16.2.7 Community Infrastructure

The Pah Rah parcel is undeveloped land. There are no schools, police protection facilities, medical facilities, water or wastewater facilities, natural gas facilities, telephone facilities, electricity generation, or transmission facilities on the project site. Two overhead 345-kV electric transmission lines are located north of the Pah Rah parcel. An overhead 60-kV electric transmission line and a gas transmission pipeline are located south of the parcel.

3.17 Transportation

This section discusses existing roadways in the Toquop area and Pah Rah parcel.

3.17.1 Toquop Area

Interstate 15 (I-15) is the only major roadway in the vicinity of the southern Toquop parcel. It is the main north-south route connecting Las Vegas, Nevada, and Salt Lake City, Utah. I-15 is approximately 11 miles south of the southern parcel. In this area, the interstate freeway is aligned southwest-northeast. Access to both the southern and northern Toquop parcels is from I-15 via the East Mesa Interchange (Exit 109) approximately 9 miles west of Mesquite, Nevada. Exit 109 is a truck rest area—a paved area without facilities that can be accessed directly from eastbound and westbound I-15.

The existing freeway exit leaves westbound I-15 directly on the north side and travels west for approximately 0.6 mile parallel to I-15 on a lightly paved two-lane road. The exit from eastbound I-15 doubles back to the west for approximately 0.6 mile parallel to and south of I-15 on another lightly paved two-lane road. The latter road then crosses under I-15 at 90 degrees through two single-lane concrete underpasses where it intersects the former road and continues west parallel to I-15 for another 0.5 mile on the north side of the freeway. The distance to the southern Toquop parcel from I-15 is 14.4 miles. The northern plant site is approximately 12 miles farther along the same road.

The access road from I-15 to the northern power plant site is in good condition except for the 8 miles between a turn-off that leads to communications towers and northern side of Toquop Wash. The section from the towers through the Toquop Wash is two-track, has many sharp turns, and requires slow speeds.

The roadway characteristics of I-15 in the vicinity of the two Toquop parcels consist of a paved divided freeway with paved shoulders, two lanes in each direction, a "good" roadway condition, and a posted speed limit of 75 mph.

Table 3-14 lists the existing and projected (year 2003) average daily traffic volume for I-15 near the East Mesa Interchange (Exit 109) and for the East Mesa Interchange offramp.

3.17.2 Pah Rah Parcel

Interstate 80 (I-80) is the major roadway in the vicinity of the Pah Rah parcel. It is an east-west route and is approximately 1.25 miles south of the parcel. The roadway characteristics of I-80 in the vicinity of the two Toquop parcels consist of a paved divided freeway with paved shoulders, two lanes in each direction, a "good" roadway condition, and a posted speed limit of 70 mph.

TABLE 3-14
Existing and Estimated Average Daily Traffic Volumes on I-15 near the Project Area

Roadway	Average Daily Vehicle Traffic (ADT)	Average Daily Truck Traffic (ADTT)[b]
I-15 near the East Mesa Interchange (2000)	15,800[a]	1,580
Eastbound	7,900[a]	790
Westbound	7,900[a]	790
I-15 near the East Mesa Interchange (2003 estimated)	18,818[c]	1,882
Eastbound	9,409[c]	941
Westbound	9,409[c]	941
East Mesa Interchange offramp (2000)	680[a]	68
Eastbound	280[a]	28
Westbound	400[a]	40
East Mesa Interchange offramp (2003 estimated)	810[c]	81
Eastbound	330[c]	33
Westbound	480[c]	48

[a] Source: Leegard (2001).
[b] Estimated at 10 percent of ADT.
[c] Calculated at 6 percent annual growth rate, based on historical traffic records.

Access to the Pah Rah parcel can occur from two locations. From the south, exit I-80 at the Derby Dam exit (Exit 36); on the north side of the freeway is an unpaved pull-out area. The parcel is approximately 1.5 miles northeast of this location. The site can be accessed on foot and is a steep climb.

Access to the Pah Rah parcel from the north is accomplished by exiting at either of two exits from I-80 at State Route (S.R.) 447 on either side of Wadsworth, Nevada. S.R. 447 is a northwest-southeast trending two-lane paved road after passing through Wadsworth. Turn west onto Olinghouse Road from S.R. 447 at approximately 3.8 miles north of I-80. Travel west approximately 4.3 miles along the graded Olinghouse Road to the transmission line road. Turn south on an ungraded road, cross an ephemeral creek, and keep right at 0.3 mile, proceeding southeast along the transmission line access road for an additional 1.6 miles to a point on the road closest to the northwest corner of the Pah Rah parcel. The site can be accessed on foot, and, depending on location, can be a steep climb.

Chapter 4

Environmental Consequences

Chapter 4.0 Environmental Consequences

4.1 Introduction

This chapter describes the environmental consequences that would result from the adoption of the Toquop Land Disposal Amendment to the Caliente MFP; exchanging either of the Toquop parcels for the Pah Rah parcel; and the construction, operation, and maintenance of the Toquop Energy Project. Effects of implementing the No Action Alternative also are described. The impact analysis focuses on potential direct, indirect, total, and cumulative impacts on the project area resources that were described in *Chapter 3, Affected Environment*. Mitigation measures are identified that would avoid, reduce, rectify, or compensate for certain adverse impacts. The final sections of this chapter describe unavoidable adverse impacts, short-term uses of the environment and long-term productivity, the irreversible and irretrievable commitments of resources, and energy requirements and conservation potential.

Assumptions and assessment guidelines for specific resource areas are summarized in the appropriate resource topics in this chapter. Common assumptions that were followed during the preparation of this DEIS are the following:

- Project features were designed only to the feasibility level, which represents reasonable approximations for assessing potential project impacts and recommending appropriate mitigation measures.
- The expected life of the project is approximately 42 years (26-month construction period and 40-year operation period).
- The design of the Tule Desert wellfield and associated pipelines would only have sufficient capacity to supply the Toquop Energy Project.
- Environmental resource data have been developed and analyzed to the level of detail necessary to understand potential impacts and to distinguish project effects (both beneficial and adverse) among the Proposed Action and alternatives.
- Ground water data developed for this study are the best available representation of current and predicted conditions.
- Construction workers would be hired from the local labor force in the Clark/Lincoln County area and most of those would commute from Las Vegas.
- Measures described in *Appendix A, Measures for Protecting Desert Tortoises and Their Habitat, Appendix B, Standard Construction and Operation Procedures, and Appendix C, Cultural Resources Programmatic Agreement,* are an integral part of the Proposed Action and Alternatives 1 and 2.
- Mitigation measures would be implemented concurrent with the construction of project features.
- Cumulative impacts consist of the potential impacts of the Proposed Action, Alternative 1, or Alternative 2 for the Toquop Energy Project plus the potential impacts of the past, present,

and reasonably foreseeable projects identified in *Chapter 1, Section 1.8, Interrelated Projects*. Only those projects that meet the criteria described in *Section 1.8* are assessed for potential cumulative impacts.

Effects of the land exchange that could result from amending the Caliente MFP and effects of the proposed Toquop Energy Project are discussed in the following text.

An option to the land exchange under the Proposed Action, Alternative 1, and Alternative 2 would be the BLM's issuing ROWs for the construction, operation, and maintenance of all project features associated with the Toquop Energy Project. Under this option, the Pah Rah parcel would continue to be privately owned and the Toquop parcel would continue to be administered by the BLM. The Caliente MFP would not be amended and potential effects resulting from the land exchange would, therefore, not occur. Project-related effects under this option would consist of those effects specifically associated with the Toquop Energy Project, which are described for the Proposed Action and Alternatives 1 and 2 according to the various resources evaluated in this chapter. The only additional effects on project area resources that would result from implementation of the Toquop Energy Project through a series of ROWs (rather than a land exchange) are described in *Section 4.16.4, Socioeconomics*.

4.2 Soils and Geology

This analysis addresses the potential soil constraints during project construction in the Toquop area. Because no impacts on soils are expected during project operation, that issue is not addressed further. This analysis also addresses the potential geologic constraints during construction in the Toquop area. Because no impacts on geology are expected during project operation, that issue is not addressed further.

Finally, this section addresses the potential impacts on minerals in the Toquop area and Pah Rah parcel.

4.2.1 Soils

4.2.1.1 Proposed Action

4.2.1.1.1 Impacts. An estimated 449 acres of soils would be disturbed and/or included in construction rights-of-way under the Proposed Action. Of this total, 267 acres would be reclaimed and 182 acres used for project features. Biological soil crusts present at the power plant site and along the proposed water pipeline corridor would be disturbed and some would be lost. However, the project has been designed to minimize the acreage of soils disturbed, and disturbed areas will be reclaimed. Soils disturbed during project construction activities may result in a temporary increase in erosion and windblown dust until construction is completed. This would result in no impact after the BMPs and SOPs are implemented. Also, paving the access road may increase the potential for localized runoff and erosion. Improved access to the area via this road may result in greater off-highway vehicle (OHV) use and resultant impacts to soils.

No construction activities would be associated with the proposed land exchange. The proposed land exchange in Washoe County (Pah Rah parcel) would not alter existing onsite soils and would not result in impacts to those soils.

4.2.1.1.2 *Mitigation.* No mitigation is proposed.

4.2.1.1.3 *Cumulative Impacts.* Because impacts on soils are short-term and localized, the Proposed Action would not contribute to a cumulative soil erosion impact.

4.2.1.2 Alternative 1

4.2.1.2.1 *Impacts.* Impacts associated with Alternative 1 would be similar to those described for the Proposed Action. An estimated 451 acres of soils, including some biological soil crusts, would be disturbed under this alternative. Of this, 269 acres would be reclaimed and 182 acres used for project features.

4.2.1.2.2 *Mitigation.* No mitigation is proposed.

4.2.1.2.3 *Cumulative Impacts.* Cumulative impacts associated with Alternative 1 would be similar to those described for the Proposed Action.

4.2.1.3 Alternative 2

4.2.1.3.1 *Impacts.* Impacts associated with Alternative 2 would be similar to those described for the Proposed Action. An estimated 581 acres of soils, including some biological soil crusts, would be disturbed under this alternative. Of this, 344 acres would be reclaimed and 237 acres used for project features.

4.2.1.3.2 *Mitigation.* No mitigation is proposed.

4.2.1.3.3 *Cumulative Impacts.* Cumulative impacts associated with Alternative 2 would be similar to those described for the Proposed Action.

4.2.1.4 No Action Alternative

Implementation of the No Action Alternative would result in no change to the Toquop area and Pah Rah parcel. Trends and future conditions in the Toquop area and Pah Rah parcel under the No Action Alternative would be generally similar to existing conditions described in Chapter 3. Therefore, no soils impacts in the Toquop area and on the Pah Rah parcel would be expected.

4.2.2 Geology

4.2.2.1 Proposed Action

4.2.2.1.1 *Impacts.* No geologic features or resources within the project area would be affected by the Proposed Action.

The presence of firmly cemented conglomerate rocks and caliche in the near-surface soils at the plant site under the Proposed Action could pose difficulties for excavation activities during construction.

The risk of adverse ground acceleration (shaking) as a result of seismic events is perceived to be very low throughout the project area. In addition, because of the following three principal reasons, the risk of liquefaction of the soils at the proposed action plant site is low: 1) the presence of the cemented conglomerate and caliche in the subsurface; 2) predominance of coarse-grained sediments in the near-surface soils; and 3) deep water table on the order of hundreds of feet (see *Section 3.4, Ground Water Resources*).

No construction or operation activities would be associated with the proposed land exchanges, and no geological impacts would occur on the Pah Rah parcel.

4.2.2.1.2 Mitigation. No mitigation is proposed.

4.2.2.1.3 Cumulative Impacts. Because no geological impacts would occur under the Proposed Action, the Proposed Action would not contribute to a cumulative impact on geologic features or resources in the Toquop area or on the Pah Rah parcel.

4.2.2.2 Alternative 1

4.2.2.2.1 Impacts. No impacts would be associated with Alternative 1, the same as described for the Proposed Action.

4.2.2.2.2 Mitigation. No mitigation is proposed.

4.2.2.2.3 Cumulative Impacts. No cumulative impacts would be associated with Alternative 1, the same as described for the Proposed Action.

4.2.2.3 Alternative 2

4.2.2.3.1 Impacts. No impacts would be associated with Alternative 2, the same as described for the Proposed Action.

4.2.2.3.2 Mitigation. No mitigation is proposed.

4.2.2.3.3 Cumulative Impacts. No cumulative impacts would be associated with Alternative 2, the same as described for the Proposed Action.

4.2.2.4 No Action Alternative

Implementation of the No Action Alternative would result in no change to the Toquop area and Pah Rah parcel. Trends and future conditions in the Toquop and Pah Rah areas under the No Action Alternative would be similar to existing conditions. Therefore, no impacts on geologic features or resources in the Toquop area and Pah Rah parcel would occur.

4.3 Surface Water Hydrology

The following text discusses potential impacts and mitigation associated with surface water in the Toquop area. No impacts would occur and no mitigation would be required for the Pah Rah parcel as a result of the Pah Rah/Toquop land exchange.

4.3.1 Proposed Action

4.3.1.1 Potential to Cause Flooding

4.3.1.1.1 Impacts. Locally high-intensity rainfall events could cause the local washes in the Toquop project area to carry high volumes of runoff for short periods of time. Some of the features of the Proposed Action are located within a Zone D flood area (undetermined flood hazards) as designated by FEMA.

The flooding potential, however, results mainly from flows in the smaller local washes and not from flows in either the Toquop Wash or the South Fork Toquop Wash, the two principal surface water drainage features in the project area. This conclusion is based on the fact that each of these larger washes has cut deep canyons or arroyos within the project area that are anticipated to contain flows that correspond to a maximum 100-year return interval runoff events.

Plant Site. Six small, unnamed washes cross Section 36 where the power plant would be located under the Proposed Action. The specific disturbed area where the plant structures and facilities would be constructed directly straddles one of these washes. That particular wash, therefore, would be filled and its watercourse diverted to one or more adjacent washes. As a result, the amount and rate of flow in the wash(es) that receive(s) the diverted flows would increase when local rainfall events are great enough to generate runoff.

Construction of the power plant would create areas that are impervious (covered by impermeable surfaces such as roofs, roads, parking areas), which would increase the amount and rate of flow of runoff from local storms. The total area rendered impervious would be approximately 15 acres. Assuming that the maximum daily rainfall at the plant site is approximately 3 inches (NOAA, 1975), the corresponding stormwater runoff from the 15 acres of impervious surfaces would be approximately 3.75 acre-feet, or approximately 2 cubic feet per second (cfs) averaged over 24 hours.

Linear Facilities. During both construction and operation, the linear facilities associated with the Proposed Action (such as, access road, water pipeline, and electricity to the wellfield) would not affect the ephemeral washes they cross.

Under the Proposed Action, the utilities (water pipeline and electricity to the wellfield) would be routed across several washes, including the South Fork Toquop Wash, and through the Toquop Gap, which is the watercourse of the main Toquop Wash. Where the utilities cross the various washes, particularly the Toquop and the South Fork, the utilities would be buried sufficiently deep so as not to affect water flow or erosional processes (scouring) in the bottom of these washes.

The access road under the Proposed Action will utilize culverts to channel storm water under the road. These culverts will be sized appropriately according to local requirements. Therefore, the road would experience flooding only during extreme runoff events, and flooding would not constitute an environmental impact.

Wellfield. The wellhead structures associated with each well would occupy an area of 1 acre or less within the Tule Desert and would be located away from ephemeral washes and other low-lying areas susceptible to flooding. In addition, the impervious surface area around each well would be small (likely less than 300 square feet). No additional surface water runoff would be generated by these impervious areas. Therefore, construction and operation of the wellfield in the Tule Desert would not affect surface water hydrology.

4.3.1.1.2 Mitigation. To mitigate the effects of additional runoff at the plant site resulting from impervious surfaces, the Proposed Action would include a stormwater retention basin with sufficient dimensions to accommodate the runoff generated by the local maximum daily rainfall event of 3 inches or less. All runoff from the impervious surfaces would be directed to this retention basin prior to being released to the natural drainage system at flow rates equivalent to pre-development conditions.

To minimize the exposure of personnel and equipment to potential flood hazards, construction activities in the washes would be scheduled to occur when the probability for flash flooding is minimal. These measures are included in *Appendix B, Standard Construction and Operation Procedures*.

4.3.1.1.3 Cumulative Impacts. Because no impacts on surface water are expected, this Proposed Action would not contribute to a cumulative surface water impact in the Toquop area.

Because no impact on surface water would occur at the Pah Rah parcel, the Proposed Action would not contribute to a cumulative surface water impact in that parcel.

4.3.1.2 Potential for Surface Water Quality Degradation

4.3.1.2.1 Impacts. Both project construction and operation in the Toquop area provide opportunity to potentially affect the surface water quality of the local washes and, in turn, the Virgin River. Water quality in the washes could be degraded by the addition of both suspended solids (sediment) and dissolved constituents (substances commonly found in stormwater runoff from parking lots and industrial areas).

During construction, earthmoving activities could increase the potential for erosion from precipitation, which, in turn, would contribute additional suspended solids (sediment load) to the runoff in the local washes. During operation, diverted runoff from the wash filled in to accommodate construction of the power plant could increase the potential for erosion, and, therefore, result in increased sediment loads in the receiving wash(es).

In addition, runoff from parking surfaces and possibly areas where plant equipment could come in contact with precipitation could add low concentrations of dissolved petroleum hydrocarbons, metals, and possibly other substances to the runoff in the local washes. Runoff from the access road could also contribute low concentrations of similar dissolved substances to the flows in the local washes.

With the implementation of commitments in Appendix B, No impacts to surface water quality are anticipated from the utilities that link the wellfield to the plant site, or from the development and operation of the wellfield.

4.3.1.2.2 Mitigation. No mitigation is proposed.

4.3.1.2.3 Cumulative Impacts. Because no impacts on surface water are expected, this Proposed Action would not contribute to a cumulative surface water impact in the Toquop area.

Because no impact on surface water would occur at the Pah Rah parcel, the Proposed Action would not contribute to a cumulative surface water impact in that parcel.

4.3.2 Alternative 1

4.3.2.1 Impacts

Existing conditions and potential impacts to surface water hydrology in the Alternative 1 project area are effectively the same as those for the Proposed Action. The difference between these alternatives is the route of the utilities; therefore, the only substantive difference is that Alternative 1 does not involve crossing the South Fork Toquop Wash by these utilities. Both alternatives, however, do involve crossing the Toquop Wash, and the impacts would be the same because only the location of the crossing would differ.

4.3.2.2 Mitigation

No mitigation is proposed.

4.3.2.3 Cumulative Impacts

As with the Proposed Action, no cumulative impacts would be associated with Alternative 1.

4.3.3 Alternative 2

4.3.3.1 Impacts

Existing conditions and potential impacts to surface water in the Alternative 2 project area are largely similar to those for the Proposed Action. The principal exception is that the power plant site under Alternative 2 (the northern site) does not contain any washes that would have to be diverted.

4.3.3.2 Mitigation

No mitigation is proposed.

4.3.3.3 Cumulative Impacts

As with the Proposed Action, no cumulative impacts would be associated with Alternative 2.

4.3.4 No Action Alternative

No changes to the existing surface water hydrologic conditions would occur under the No Action Alternative; therefore, no impacts to surface water hydrology would occur.

4.4 Ground Water Resources

This section evaluates the potential impacts associated with pumping ground water from the Tule Desert to supply approximately up to 7,000 acre-feet of water per year (afy) for 42 years to the proposed project. These impacts not only include the potential project-induced effects on ground water resources, but also the potential project-induced effects on other water resources (springs and surface water bodies).

4.4.1 Proposed Action

4.4.1.1 Potential for Decline in Ground Water Levels and Depletion of Ground Water Resources

4.4.1.1.1 Impacts. Pumping water from the fractured-rock aquifer in the Tule Desert in the amount and rates necessary to serve the proposed project would not result in a substantial decline in ground water levels or a substantial depletion of ground water resources. Water levels within the Tule Desert would be lowered as a result of project pumping, but not to the extent that a substantial depletion of ground water resources would occur.

Outside the Tule Desert, specifically in the Virgin River Valley hydrographic area, ground water levels, as well as the availability of the ground water resources, would remain unchanged as a result of pumping in the Tule Desert.

Specifically, based on the results of an analysis of potential water level decline (drawdown) presented in CH2M HILL (2002), ground water levels will be lowered within the Tule Desert a minimum of approximately 45 feet within a radius of approximately 1,000 feet from a representative production well (pumping at a rate of 1,100 gallons per minute [gpm]) under the conditions determined from the local aquifer testing (see *Section 3.4.2.1.2, Ground Water in the Fractured Rock*). The maximum drawdown would remain above the top of the fractured-rock aquifer and no de-watering of the aquifer would occur.

The same representative well would drawdown the water level 0.5 foot at a distance of roughly 1.5 miles from the well. Beyond 1.5 miles from a representative well, the drawdown would be less than 0.5 foot. Accordingly, project pumping would not result in a substantial water-level decline outside of the Tule Desert because the wellfield would be designed such that the wells would be: 1) spaced to minimize additive effects on drawdown; and 2) located at least 1.5 miles from the edge of the Virgin River Valley hydrographic area.

These results occur largely because of the steep lateral hydraulic gradient in the Tule Desert fractured-rock aquifer (discussed in *Section 3.4.2.1.2, Ground Water in the Fractured Rock*. The steep gradient is indicative of the relatively poor ability of the Tule Desert fractured-rock aquifer to transmit ground water (low transmissivity), which acts to limit the lateral extent of water level decline around a pumping well (that is, the lower the transmissivity, the smaller the radius of influence around a well). In addition, the steep gradient means that most of the water entering the project wells would do so from the upgradient direction (from the north in the Tule Desert), causing water level declines to be less over a similar distance south of the production wells toward the downgradient Virgin River Valley.

Although the water levels will be lowered in the vicinity of each production well, there would be no significant depletion of the ground water resource within the Tule Desert. The amount of annual ground water flow through a 4-mile wide portion of the basin within the fractured-rock aquifer has been estimated to be slightly less (6,500 afy) than the amount of water required for the project (7,000 afy). Additional ground water also flows within the Tule Desert outside this 4-mile width and at depths greater than investigated to date (see *Section 3.4.2.1.2, Ground Water in the Fractured Rock*).

As long as the fractured-rock aquifer is not de-watered (that is, the water level does not decline below the top of the fractured rock), the lower water levels correspond to a localized decrease in the pressure exerted by the water in the fractures, and do not represent a significant loss of water from storage. This occurs because the aquifer is confined under pressure, and would continue to be confined during project pumping as long as the fractured rock remains fully saturated.

In the Tule Desert basin-fill deposits, the actual extent of the water level decline that would be caused by project pumping is unknown because of the aquifer complexity and the limited available data. However, the amount of ground water level decline in the basin-fill would be no greater than that anticipated for the fractured rock, and most likely considerable less based on the understanding that the ability of the basin-fill deposits to transmit water (aquifer transmissivity) is very low and because ground water in the basin fill is unconfined (see *Section 4.2.1* and CH2M HILL, 2002). For the purpose of this impacts assessment, the water level decline is conservatively assumed to be the same in the basin fill as it is in the fractured rock. Accordingly, there would not be a substantial water-level decline in the basin fill material outside of the Tule Desert.

The only known current water well that taps basin-fill ground water in the Tule Desert is the Tule Well, which is capable of pumping approximately 8 gpm on demand. Given the distance of this well from the area where the project wells are likely to be located (that is, it is located more than 1.5 miles from where a project well would be located), together with the small well yield and water demand associated with this well, it is unlikely that this well would be adversely affected by project pumping.

There are no current users of ground water from the fractured-rock aquifer in the Tule Desert. Consequently, no existing wells would be affected by the water level decline that would occur in the fractured-rock aquifer within the Tule Desert.

Because ground water in Virgin River Valley is a vital source of water to municipalities and agriculture in the region, the potential impacts of project pumping on this resource must be assessed thoroughly. Therefore, in addition to the drawdown analysis, presented above, which indicates that water level declines will be restricted to roughly 1.5 miles from the pumping wells, the conclusion that project pumping would not result in either substantial ground water level declines or a substantial loss depletion of the ground water resource within the Virgin River Valley is further supported by the following factors:

- As presented in *Section 4.2.1, Ground Water Resources*, the available perennial yield in the lower Virgin River Valley is estimated by Dixon and Katzer (2002) to be approximately 40,000 afy, even after the current local pumping in the Virgin River Valley, reported to be about 12,000 afy, is taken into account. This estimate implies that even if the entire project demand were to be pumped directly from the lower Virgin River Valley, there would still be 33,000 afy of perennial yield available within the Virgin River Valley.
- The volume of ground water in storage in the uppermost 100 feet of saturated sediments in the Virgin River Valley is estimated to be close to 3 million acre-feet (see *Section 3.4*). This volume is more than 10 times the entire 42-year water demand of the project. A vast amount of ground water is, therefore, stored within the Virgin River Valley. Even in the absence of available perennial yield, this much water in storage effectively mitigates the extent of water level decline caused by local pumping. Consequently, even if the entire project demand were pumped directly from the Virgin River Valley, and not from the proposed location in the Tule Desert, the resulting water level decline in the Virgin River Valley could be controlled through the wellfield design such that no existing wells would be adversely affected. In other words, through optimizing the spacing the wells, the water level decline associated with pumping 7,000 afy could be kept at levels that would not affect the water levels in existing production wells within the Virgin River Valley).

  This conclusion is further supported by the results of two different analyses, the first being the results of the Tule Desert drawdown analysis discussed above. Ground water in the Muddy Creek Formation is understood to be unconfined and the aquifer generally no more transmissive than the fractured-rock aquifer of the Tule Desert. Accordingly, a similar limited area of influence of a given pumping well in the Tule Desert should also occur in the Muddy Creek Formation (that is, drawdowns of no more than approximately half a foot at distances of roughly 1.5 miles from the pumping well).

Second, the results of a study of spatially concentrated pumping 10,000 afy from the Muddy Creek Formation in the vicinity of Halfway Wash indicates that drawdowns on the order of 5 feet extend no more than 6 miles from the pumping center after 50 years (Las Valley Water District, 1992).

- Based on the generally southern direction of the hydraulic gradient of ground water in the Tule Desert fractured-rock, ground water inflow from the wellfield portion of Tule Desert into the Virgin River Valley occurs primarily west of Toquop Wash and downgradient of the current municipal production wells that serve the towns of Mesquite and Bunkerville. This implies that ground water intercepted by the project wells in the Tule Desert would not flow, in the absence of project pumping, toward existing Virgin River Valley wells. Project pumping, therefore, would not affect ground water flowing to existing Virgin River Valley wells, and water levels in these wells would similarly not be affected by the proposed project.

- A comparison of the C-14 data from the fractured-rock aquifer in the Tule Desert (PW-1) with the available data from municipal wells in the Virgin River Valley (Bunkerville 1 and 2, and Virgin Valley 5 and 25) clearly indicate that age of the ground water is significantly different between these two areas—implying a different source for each water type. Pumping in the Tule Desert, therefore, would not affect the existing municipal wells in the Virgin River Valley because they have independent sources.

  Specifically, the value of C-14 at PW-1 (0.9 percent modern carbon) approaches the maximum age for using C-14 for dating purposes (approximately 40,000 to 50,000 years old; see *Section 3.4.2.1.2, Ground Water in the Fractured Rock*).

  Carbon-14 data from the municipal production wells in the Virgin River Valley reveal the following two related occurrences: 1) the ground water from the Virgin River Valley wells is younger than the ground water from PW-1 in the Tule Desert; and 2) the age of the ground water from the Virgin River Valley wells increases from east to west (that is, in a downstream direction along the Virgin River). Both of these observations support the occurrence of independent ground water flow paths between the proposed wellfield area in the Tule Desert and the existing municipal wells in the Virgin River Valley. Specifically, they reinforce the conclusions made above that ground water that currently flows beneath the Tule Desert enters the Virgin River Valley downstream of the Virgin Valley municipal wells.

With respect to the regional carbonate-aquifer system, the rate of ground water extraction for this project would be only a small fraction of the total capacity of the aquifer. Within the Colorado River Basin, the flow has been estimated to be approximately 200,000 afy (see *Section 4.2.1, Ground Water Resources*). The project demand of approximately 7,000 afy is 3.5 percent of that amount.

4.4.1.1.2 *Mitigation.* No mitigation is proposed. The ground water levels in the Tule Desert, however, will be monitored and any significant decline in ground water level in the Tule Desert downgradient of the wellfield will be assessed with respect to its potential consequences to ground water conditions in the Virgin River Valley.

In addition, the wellfield will be designed to avoid affecting the existing Tule Well, and ground water levels in the vicinity of the Tule Well will be monitored to ensure appropriate mitigation can be planned and implemented should the water levels in the Tule Well be adversely affected by project pumping.

4.4.1.1.3 *Cumulative Impacts.* The potential cumulative impacts on ground water of the interrelated projects described in *Section 1.8, Interrelated Projects*, were assessed. The development that would result from the full implementation of the Lincoln County Land Act and the Mesquite Land Act will likely have a considerable associated water demand. Currently, however, sufficient information about the specific water demands and potential sources associated with these potential developments is unavailable. It is therefore not possible to assess this potential development in the context of potential cumulative impacts to Tule Desert ground water resources.

No other reasonably foreseeable actions are known to be planned in the region that would utilize the ground water resources from the Tule Desert; therefore, no cumulative impacts to ground water resources would occur.

4.4.1.2 Spring Discharge

4.4.1.2.1 *Impacts.* Pumping water from the fractured-rock aquifer in the Tule Desert in the amount and rates necessary to serve the proposed project would not result in a change in the flows of the springs in the hills and mountains that rim the Tule Desert.

As discussed in *Section. 4.2.1, Ground Water Resources*, the source of water to the springs in the project area is local recharge (that is, precipitation that infiltrates near to these springs and subsequently travels a relatively short distance before being discharged at a spring). In addition, the elevations of all of the local springs are several hundred feet above the local and regional ground water levels, further indicating the springs are not connected to the ground water systems of the Tule Desert. The rate of discharge of the springs is therefore independent of ground water in both the fractured-rock and the basin-fill aquifers, and pumping from the fractured-rock aquifer within the Tule Desert would not affect the discharge of any spring.

In addition, pumping from the fractured-rock aquifer in the Tule Desert would not affect any of the regionally significant springs in the vicinity of the project area, including the Littlefield Springs, Muddy Springs and the springs adjacent to the shore of Lake Mead. Although some of these springs are related to the regional carbonate aquifer, the ground water that discharges from these springs is not related to ground water in the Tule Desert (i.e., ground water in the Tule Desert is not the source of any of these springs; they all can be traced to different sources) (see *Section 4.2.1, Ground Water Resources*).

4.4.1.2.2 Mitigation. No mitigation is proposed.

4.4.1.2.3 Cumulative Impacts. No cumulative impacts are anticipated. It has been determined that the source of water to the springs is local recharge and is not tied to the ground water systems of the Tule Desert.

4.4.1.3 Ground Water Quality

4.4.1.3.1 Impacts. Ground water quality would not be degraded as a result of the proposed project. The pumping of ground water and the resulting localized water level declines would not alter the water quality of the aquifer systems in the Tule Desert.

The quality of the ground water in the fractured-rock aquifer of the Tule Desert is likely to be highly variable across the basin because of the different compositions of the rock (for example, limestone, volcanic rocks, siltstone with possible gypsum layers) (see *Section 4.2.1, Ground Water Resources*). As a result, the quality of the ground water pumped in the Tule Desert could change over time as ground water flows from different rock types to the wells and the influence of specific fractures that contribute ground water to the wells changes. These potential changes in the quality of the water pumped, however, would not imply a degradation in water quality of the aquifer.

The temporary handling and storage of potential chemical substances and waste products have a slight potential to affect ground water quality adversely at the locations of the plant sites should there be a release of these substances to the environment. The potential for ground water-quality degradation is minimal; however, because the climate is arid, which reduces the potential for infiltration into the ground, and the depths to ground water are considerable (on the order of several hundred feet).

4.4.1.3.2 Mitigation. No mitigation is proposed.

4.4.1.3.2 Cumulative Impacts. No reasonably foreseeable actions are known to be planned in the project area that would affect the quality of the ground water resources; therefore, no cumulative impacts to ground water quality would occur.

4.4.1.4 Flow in the Virgin River

4.4.1.4.1 Impacts. The flow in the Virgin River would not be affected by pumping in the Tule Desert for the Proposed Action. As discussed in *Section 4.2.1 Ground Water Resources*, multiple lines of evidence indicate that the Virgin River is not recharged by regional ground water systems as it flows from Littlefield, Arizona, to Lake Mead. In fact, it has been demonstrated that the river naturally loses flow through infiltration, evaporation, and diversion for irrigation along this area.

In addition, a comparison of water-chemistry data from the river and the ground water in the Tule Desert indicates that there is no connection between the two waters (*Section 4.2.1, Ground Water Resources*). Furthermore, an analysis of the chemical data from the Virgin River reveals that the origin of the flows in the river downstream of Littlefield are from Beaver Dam Wash and upstream Virgin River flows (that is, all of the flow in the river can be accounted for through these sources, none of which can be attributed to ground water).

4.4.1.4.2 Mitigation. No mitigation is proposed. The ground water levels in the Tule Desert, however, will be monitored and any significant decline in ground water level in the Tule Desert downgradient of the wellfield will be assessed with respect to its potential consequences to ground water conditions in the Virgin River Valley and flows in the Virgin River.

4.4.1.4.3 Cumulative Impacts. Because no impacts to flows in the Virgin River would result from this project, no cumulative impacts would occur.

4.4.1.5 Land Subsidence

4.4.1.5.1 Impacts. Based on detailed analysis of the soil conditions in the Tule Desert basin-fill deposits, and the potential drawdown that could occur in these deposits as a result of project pumping, the potential for land subsidence is insignificant and the corresponding loss of storage negligible.

Specifically, the maximum amount of settlement ranges between 0.3 inches and 0.6 inches in the vicinity of PW-1 and MW-4, and between 2.5 inches (for the clayey sand) and up to 13 inches (for the silty sand) in the vicinity of MW-2 (CH2M HILL, 2002; Appendix F). The maximum corresponding percent reduction in porosity is less than 1 percent.

4.4.1.5.2 Mitigation. No mitigation proposed.

4.4.1.5.3 Cumulative Impacts. Because no land subsidence impacts would occur as a result of this project, no cumulative impacts would occur.

4.4.2 Alternative 1

4.4.2.1 Impacts

The location and requirements of the wells for Alternative 1 would be the same for the Proposed Action. As a result, the potential impacts would similarly be the same.

4.4.2.3 Mitigation

Mitigation measures described for the Proposed Action will also be applied under Alternative 1.

4.4.2.4 Cumulative Impacts

As with the Proposed Action, no cumulative impacts would be associated with Alternative 1.

4.4.3 Alternative 2

4.4.3.1 Impacts

The location and requirements of the wells for Alternative 2 would be the same for the Proposed Action. As a result, the potential impacts would similarly be the same.

4.4.3.2 Mitigation

Mitigation measures described for the Proposed Action will also be applied under Alternative 2.

4.4.3.3 Cumulative Impacts

Cumulative impacts associated with Alternative 2 would be similar to those described for the Proposed Action.

4.4.4 No Action Alternative

There would be no changes to the existing ground water conditions under the No Action Alternative; therefore, there would not be any land subsidence impacts.

4.5 Biological Resources

4.5.1 Threatened, Endangered, and Sensitive Species

4.5.1.1 Proposed Action

4.5.1.1.1 Impacts

Toquop Area. Direct impacts (effects) on threatened, endangered, and sensitive species can result from ground disturbance caused by construction-related activities and project operation and maintenance. Indirect impacts can result from increased public access and project maintenance. Ground disturbance impacts vegetation by habitat destruction and degradation resulting from soil compaction and vegetation removal, and by erosion when vegetation is lost. The loss of vegetative cover can adversely affect sensitive wildlife species dependent on vegetation for food or cover. Impacts can occur as a result of construction, operation, and maintenance of the power plant and associated facilities.

Ground disturbance can also have a more permanent impact because of the take of wildlife species. Wildlife can be adversely impacted by increased human activity that causes wildlife harassment, legal and non-legal take of wildlife species, take from vehicles on roads or increased off-road use, and general disturbance of wildlife. Long-term impacts can occur from loss of vegetation and wildlife habitat resulting from the slow process of revegetation in disturbed areas, because of erosion, or continued disturbance from maintenance.

Desert Tortoise. Direct impacts on desert tortoise habitat would result from ground disturbing construction activities. Project features and construction rights-of-way associated with the Proposed Action would be located on approximately 449 acres of desert tortoise habitat. Assuming an average density of approximately 11 desert tortoises per square mile (640 acres) in the general area (see affected environment discussions in Section 3.5.1, *Threatened, Endangered, and Sensitive Species*), 449 acres would provide habitat for 8 desert tortoises. The net new long-term disturbance of 182 acres, following reclamation of disturbed sites, would provide habitat for three desert tortoises. The resultant short-term and long-term loss of vegetation would reduce the amount of forage available to tortoises. Activities associated with project construction could potentially injure or kill tortoises. Vehicles and heavy construction equipment pose the greatest hazard to tortoises and their burrows. Tortoise fencing installed along the access road under the Proposed Action would minimize or eliminate the potential for highway-related mortality (see below and *Appendix A, Measures for Protecting Desert Tortoises and Their Habitat,* for a discussion of this and other desert tortoise mitigation measures). This access road would pass through the Mormon Mesa ACEC and desert tortoise critical habitat.

Indirect impacts on tortoises could result from increases in human activity during construction, operation, and maintenance. Impacts from increased human activity could include further habitat disturbance from recreational OHV activity, direct mortality from off-road vehicles crushing tortoises, increased illegal collecting of tortoises, and mortality from vandalism (for example, shooting). Mitigation measures, particularly fencing requirements, would be effective in reducing potential impacts from traffic on the access road to the plant site. With tortoise undercrossings provided at intervals of not greater than 1 mile on the access road, habitat fragmentation resulting from road improvements would not be a concern. Potential impacts from maintenance of the water pipeline would be greatly reduced through worker education measures.

Southwestern Willow Flycatcher, Yuma Clapper Rail, Woundfin, and Virgin River Chub. Implementing the Proposed Action would have no direct or indirect impact on riparian or aquatic habitats of the Virgin River on which these species depend.

Species of Concern and Other Sensitive Species. The Gila monster and chuckwalla likely occur in the project area, particularly in areas with rocky outcrops. Both species would be subjected to the same impacts described for desert tortoises. Impacts on migratory birds identified in *Section 3.5.1,Threatened, Endangered, and Sensitive Species,* including the FWS candidate species, the yellow-billed cuckoo, would be avoided as long as nests are not disturbed during the breeding season. No significant bat roosts are known to occur within or adjacent to the construction zones and, therefore, no impacts are anticipated.

Pah Rah Parcel. No direct or indirect impacts to sensitive species, including sage grouse, are anticipated as a result of the land transfer. No new ground disturbing activities on the Pah Rah parcel are part of this aspect of the Proposed Action. Acquisition of the Pah Rah parcel would bring important wildlife habitat under BLM management, particularly for sage grouse.

4.5.1.1.2 Mitigation. No mitigation is proposed; however, the project includes measures to protect desert tortoise and their habitat (see *Appendix A*). Measures have been established in the *Approved Caliente Management Framework Plan Amendment (APA)* and *Record of Decision (ROD) for the Management of Desert Tortoise Habitat* (BLM, 2000) and are applicable to this proposed project. These measures include the Terms and Conditions to implement the Reasonable and Prudent Measures in the FWS's Biological Opinion (BO) for the APA (FWS, 2000). Of the eight Reasonable and Prudent Measures implemented to reduce the take of desert tortoises and their habitat, Numbers 5, 6, and 7 are applicable to this project. Also included are the Standard Operating Procedures (SOP) that were issued by BLM to aid in the recovery of the desert tortoise. These measures are consistent with those developed for the *Clark County Multiple Species HCP and EIS* (Clark County, 2000). For the Toquop Energy Project, permanent tortoise-proof fencing will be required for the access road from I-15 to the plant because the road is within an ACEC. Measures to protect desert tortoise, in addition to those commitments contained in *Appendix A*, may be further developed during formal consultation with the FWS under Section 7 of the ESA and stipulated in the BO for this project.

Appendix B, Standard Construction and Operation Procedures, contains measures to prevent or minimize the potential for impacts on other special status species. Examples include consideration of bird breeding seasons, burrowing owls, bat roosts (if encountered), Gila monsters, and chuckwallas.

4.5.1.1.3 Cumulative Impacts. Potential impacts on desert tortoises from other proposed activities in the vicinity of the project include other power projects, land sales, and a gas pipeline (see *Section 1.8, Interrelated Projects*). Currently proposed power plants include the Moapa/Paiute Energy Center and Meadow Valley Generating Project, both of which would impact desert tortoise habitat if constructed. The proposed Kern River Expansion gas pipeline project would also disturb desert tortoise habitat in the project area and region. Given that pipeline construction in the project area is currently schedule for winter months, little or no increase in mortalities would result from construction activity. An ongoing potential exists for added incremental impacts from all projects that could have long-term effects. The improvement of existing roads and the construction of new roads could lead to increased human activities. Increased public access potentially increases tortoise mortality resulting from shooting, the number of tortoises collected for pets, and the number of tortoises run over by vehicles. Also, increased access elevates the potential for the public to release diseased tortoises into the wild. The sale and build-out of the Lincoln County Land Act and Mesquite Land Act property could add to direct and indirect impacts on desert tortoise in Lincoln County; however, these impacts would be greatly reduced by implementation of the *Southeastern Lincoln County Multi-Species Habitat Conservation Plan* (HCP) currently under development. Other sensitive species would also benefit from implementation of this HCP. It is anticipated that the permitting process for the proposed project would have been completed before completion and implementation of the HCP; therefore, the proposed project would not be subject to any additional provisions of the HCP.

A detailed analysis of cumulative impacts of federal actions on the desert tortoise in southern Nevada is provided in the proposed *Caliente Management Framework Plan and Amendment* and the *Final Environmental Impact Statement for the Management of Desert Tortoise Habitat* (BLM, 1999). Of the large interrelated projects considered in this analysis approximately 2,500 acres would be affected by the Kern River Expansion Project, approximately 24,000 acres would be affected by the Lincoln County Land Act and Mesquite Land Act, approximately 1,250 acres affected by the three power projects. The combined area of impact of all projects represents less than 27,750 acres—or 0.006 percent of the approximately 5 million acres of tortoise habitat in southern Nevada.

4.5.1.2 Alternative 1

4.5.1.2.1 Impacts. Because the project features, their operation, and associated actions under Alternative 1 would be the same or nearly the same as described for the Proposed Action, the impacts would also be similar. Because the water pipeline (eastern alignment) would only be 0.1 mile longer in this alternative, the area of ground disturbance and project rights-of-way would be 451 acres (182 acres of net new long-term disturbance following reclamation)—nearly the same as the amount of desert tortoise habitat affected under the Proposed Action. However, because the eastern water pipeline would run next to an existing road for 85 percent of its length, impacts from increased human activity during construction and maintenance would be relatively less than for the Proposed Action.

4.5.1.2.2 Mitigation. Mitigation measures would be the same as those described for the Proposed Action.

4.5.1.2.3 Cumulative Impacts. Cumulative impacts would be the same as those described for the Proposed Action.

4.5.1.3 Alternative 2

4.5.1.3.1 Impacts. Because the project features, their operation, and associated actions for the power plant and wellfield for Alternative 2 would be the same or similar to those for the Proposed Action, the impacts would also be similar to those described for the Proposed Action. The location of the power plant adjacent to the wellfield in the Tule Desert under Alternative 2 would not increase the relative direct impacts from power plant construction. Eliminating the need for constructing a long water pipeline would greatly reduce direct and indirect impacts from construction and maintenance of this feature. However, construction of the 12.0-mile natural gas pipeline and electrical transmission line and the adjacent access road would greatly increase both direct and indirect impacts through increased ground disturbance and human activities from construction, operation, and maintenance of the project relative to the Proposed Action. The area of ground disturbance and project-related rights-of-way would total 581 acres of desert tortoise habitat under Alternative 2. This would provide habitat for 10 desert tortoises. The net new long-term disturbance of 237 acres, following reclamation of disturbed sites, would provide habitat for four desert tortoises. The potential for increased predation by ravens on the desert tortoise as a result of new electrical transmission line would be much greater under Alternative 2 than the Proposed Action or Alternative 1. The new transmission line would provide new nesting and roosting sites for ravens in an area where few are currently available.

4.5.1.3.2 Mitigation. Mitigation measures would be the same as those described for the Proposed Action, but would need to be applied to the specific project features associated with Alternative 2.

4.5.1.3.3 Cumulative Impacts. Cumulative impacts would be similar to those described for the Proposed Action, but greater because of the increase in direct and indirect impacts.

4.5.1.4 No Action Alternative

Under the No Action Alternative, none of the direct or indirect impacts on threatened, endangered, or sensitive species described for the Proposed Action or alternatives would occur.

4.5.2 Vegetation and Noxious Weeds

4.5.2.1 Proposed Action

4.5.2.1.1 Impacts

Toquop Area. Direct impacts on vegetation would result from construction-related activities, and some indirect impacts would result from increased public access and project maintenance. Impacts on vegetation would result from direct removal, degradation caused by soil compaction, and increased erosion. Increased human activity associated with power plant construction, new road construction, and other project features would also impact vegetation by hindering revegetation in continually disturbed areas.

The Proposed Action would result in the disturbance or loss of 449 acres and associated vegetation. Following reclamation, the net new long-term disturbance would be 182 acres. Plants would be crushed during land-disturbing activities such as blading, grading, vehicular traffic, and trenching. Numerous species of cactus and yuccas are protected by state laws and occur throughout the project area. Several high-density areas of cactus and Joshua trees would be traversed by the water pipeline alignment between the proposed wellfield and the Toquop Gap, and between the Toquop Gap and the power plant site. Improved access to the area may encourage greater OHV use and related impacts on vegetation.

The Proposed Action would increase the potential for the introduction and spread of noxious weeds on the project site. Noxious weeds identified in the project area include Russian thistle and, in the Toquop Gap, tamarisk. Because the isolated tamarisk stands in the Toquop Gap do not provide special wildlife habitat, they will be treated as any other species of noxious weed. Noxious weeds could spread via vehicles and soil disturbance activities during project development. However, the measures described in *Appendix B, Standard Construction and Operation Procedures*, include reclamation and BLM's standard weed control measures that would be effective in reducing the potential for spread of noxious weeds and their establishment in reclaimed areas. Through implementation of the Proposed Action, the Toquop parcel would no longer be under noxious weed management of the BLM and would fall under State of Nevada regulations. All other rights-of-way would remain under BLM weed management. All rights-of-way will be managed according to a BLM-approved integrated management plan.

Pah Rah Parcel. Native vegetation would benefit from BLM management practices if the land exchange were to occur. Long-term monitoring, regulated livestock grazing, and fire suppression are common BLM management practices that would enhance the condition of vegetation. Vegetation would be given added protection under BLM management. No other effects would be expected to occur on the Pah Rah parcel because land use would not change. No records of noxious weeds are associated with the Pah Rah parcel. The Proposed Action would not impact the potential for the introduction or spread of noxious weeds on the Pah Rah parcel.

4.5.2.1.2 Mitigation

Toquop Area. A temporary fencing plan for the pipeline right-of-way would be prepared to protect restoration efforts as part of Measure 16 for protecting desert tortoise and their habitat (see *Appendix A*)

Pah Rah Parcel. No mitigation measures are proposed for the Pah Rah parcel.

4.5.2.1.3 Cumulative Impacts. Impacts on vegetation may result from other proposed activities in the project area (see *Section 1.8, Interrelated Projects*), including other power projects, land sales, and a pipeline. An ongoing potential would exist for added incremental impacts that could have long-term effects. The improvement of existing roads and construction of new roads could lead to increased human activities and potential ongoing disturbance to vegetation. Given the comparatively few acres that would be disturbed by the proposed project, the incremental affect on a cumulative basis would be similar to those described for desert tortoise habitat (see *Section 4.5.1.1.3, Cumulative Impacts*).

4.5.2.2 Alternative 1

4.5.2.2.1 Impacts. Because the project features, their operation, and associated actions under Alternative 1 would be the same or nearly the same as described for the Proposed Action, the impacts would be similar. Because the water pipeline (eastern alignment) would only be 0.1 mile longer in this alternative, the area of ground disturbance and project rights-of way resulting in habitat loss would total 451 acres (net new long-term disturbance of 182 acres)—nearly the same as the Proposed Action. However, because the water pipeline would run next to an existing road for 85 percent of its length, the quality of the vegetation impacted would be relatively less than for the Proposed Action. This alternative pipeline route supports a lower density of cacti species and Joshua trees overall compared to the Proposed Action. Higher-density pockets of cacti and Joshua trees occur in some areas, such as the Summit Spring area. However, newly disturbed areas adjacent to existing roads are more susceptible to noxious weeds.

4.5.2.2.2 Mitigation. Mitigation measures would be the same as those described for the Proposed Action.

4.5.2.2.3 Cumulative Impacts. Cumulative impacts would be similar to those described for the Proposed Action.

4.5.2.3 Alternative 2

4.5.2.3.1 Impacts. Because the project features, their operation, and associated actions for the power plant and wellfield would be the same or similar to those for the Proposed Action, the impacts on vegetation would also be similar to those described for the Proposed Action. The location of the power plant adjacent to the wellfield in the Tule Desert would not increase the relative direct impacts from power plant construction. Eliminating the need for constructing a long water pipeline would greatly reduce direct and indirect impacts from construction and maintenance of this feature. However, construction of the 12.0-mile natural gas pipeline and electrical transmission line and the adjacent access road to the power plant site would greatly increase ground disturbance and the subsequent loss of vegetation. The area of ground disturbance and project-related rights-of-way would total 581 acres under Alternative 2. Following reclamation, the net new long-term disturbance would be 237 acres.

4.5.2.3.2 Mitigation. No mitigation is proposed.

4.5.2.3.3 Cumulative Impacts. Cumulative impacts would be similar to those described for the Proposed Action.

4.5.2.4 No Action Alternative

Under the No Action Alternative, new impacts on vegetation would not occur. There would be less potential for noxious weeds being introduced to the project area.

4.5.3 Wild Horses and Burros

4.5.3.1 Proposed Action

4.5.3.1.1 Impacts. The Pah Rah parcel would be managed by BLM as a "horse free" area in the existing Herd Area for wild horses and burros. No effects would be expected to occur because the current land use would not change.

4.5.3.1.2 Mitigation. No mitigation is proposed for wild horses and burros because no impacts from the Proposed Action are anticipated.

4.5.3.1.3 Cumulative Impacts.

Implementation of the Proposed Action would not contribute to cumulative impacts on wild horses and burros.

4.5.3.2 Alternative 1

Impacts, mitigation, and cumulative impacts on wild horses and burros for this alternative would not differ from those described for the Proposed Action. No adverse impacts would be expected.

4.5.3.3 Alternative 2

Impacts, mitigation, and cumulative impacts on wild horses and burros for this alternative would not differ from those described for the Proposed Action. Fencing that will enclose the power plant and associated facilities on the northern Toquop parcel will prevent access by wild horses. No adverse impacts would be expected.

4.5.3.4 No Action Alternative

No impacts on wild horses or burros would occur under the No Action Alternative.

4.5.4 Wildlife and Fisheries Resources

4.5.4.1 Proposed Action

4.5.4.1.1 Impacts

Toquop Area. Direct and indirect impacts on wildlife and wildlife habitat would result from implementing the Proposed Action. Direct impacts would result from ground disturbance during construction-related activities and project operation and maintenance that would total 449 acres. Following reclamation, the net new long-term disturbance would be 182 acres. Direct impacts would also occur from vehicle-wildlife conflicts during construction and operation. Desert bighorn sheep may be impacted by increased traffic on that portion of the access road between the proposed plant site and I-15 where it passes through a portion of the East Mormon foothills. Indirect impacts would result from increased public access and project maintenance. Habitat loss through the loss of vegetative cover would have an adverse effect on wildlife species dependent on vegetation for food or cover. In general, impacts on wildlife and wildlife habitat would be the same as those previously described in *Section 4.5.1* for threatened, endangered, and sensitive species of plants and wildlife.

Impacts on reptiles and small mammals would occur as a result of the ground disturbance associated with project construction, operation, and maintenance. Direct impacts to reptiles and small mammal species would include mortalites from construction activity and vehicular traffic. Reptile habitat would be destroyed as a result of earth moving activities, and direct mortalities may result from reptiles being crushed underground or run over by earth moving equipment. Some wildlife species would be temporarily displaced during construction activities.

During construction, dust and other construction-related disturbances may affect plants and wildlife. Construction may possibly fragment existing habitat use patterns, leading to a reduction in quality of habitat adjacent to new construction.

No direct or indirect impacts on aquatic habitat and fisheries of the Virgin River would result from ground water pumping for the Proposed Action. No short-term, adverse impacts from ground water pumping on the availability of water to wildlife are anticipated.

The Toquop area, and the Pah Rah parcel described below, are both mostly undisturbed, but support very different plant and wildlife communities. Both support wildlife habitat of value to Nevada and the nation.

Pah Rah Parcel. No negative impacts on wildlife resources on the Pah Rah parcel, including pronghorn antelope and sage grouse, are anticipated from the land transfer. Acquisition of the Pah Rah parcel would bring important wildlife habitat under BLM management and would foster enhanced management by the BLM for sensitive wildlife species.

4.5.4.1.2 Mitigation. No mitigation is proposed.

4.5.4.1.3 Cumulative Impacts. Impacts on wildlife and wildlife habitat from other proposed activities in the region include other power projects (Moapa/Paiute Energy Center, Meadow Valley Generating Project), land sales and a pipeline (see *Section 1.8, Interrelated Projects*). An ongoing potential would exist for added incremental impacts that could have long-term effects. The improvement of existing roads and construction of new roads could lead to increased human activities. Increased human activity would potentially increase mortality to some wildlife from vandalism. The sale and build-out of the Lincoln and Clark County Land Act and Mesquite Land Act property could add to impacts on wildlife and wildlife habitat in Lincoln and Clark County; however, these impacts would be greatly reduced by implementation of the *Southeastern Lincoln County Multi-Species Habitat Conservation Plan* currently under development and the *Clark County Multiple Species HCP*. All wildlife species would benefit from implementation of this HCP.

4.5.4.2 Alternative 1

4.5.4.2.1 Impacts. Because the project features, their operation, and associated actions under Alternative 1 would be the same or nearly the same as those described for the Proposed Action, the impacts would be similar. A total of 451 acres would be disturbed during construction of project features. Net new long-term disturbance following reclamation would be 182 acres. The water pipeline (eastern alignment) would be 0.1 mile longer in this alternative than the Proposed Action. However, because the water pipeline would run next to an existing road for 85 percent of the line, relative impacts from increased human activity associated with construction and maintenance would be relatively less than for the Proposed Action.

4.5.4.2.2 Mitigation. No mitigation is proposed.

4.5.4.2.3 Cumulative Impacts. Cumulative impacts would be similar to those described for the Proposed Action.

4.5.4.3 Alternative 2

4.5.4.3.1 Impacts. Because the project features, their operation, and associated actions for the power plant and wellfield would be the same or similar to those for the Proposed Action, the impacts on wildlife also would be similar to those described for the Proposed Action. The location of the power plant adjacent to the wellfield in the Tule Desert would not increase the relative direct impacts from power plant construction. Eliminating the need for a long water pipeline would greatly reduce direct and indirect impacts from construction and maintenance of this feature. However, construction of the 12.0-mile natural gas pipeline and electrical transmission line and the adjacent access road would greatly increase direct and indirect impacts because of increased ground disturbance and human activities associated with construction, operation, and maintenance. The area that would be disturbed and/or included in construction-related rights-of-way would total 581 acres under Alternative 2. Following reclamation, the net new long-term disturbance would be 237 acres.

4.5.4.3.2 Mitigation. No mitigation is proposed.

4.5.4.3.3 Cumulative Impacts.

Cumulative impacts would be similar to those described for the Proposed Action, but greater because of the increase in direct and indirect impacts.

4.5.4.4 No Action Alternative

Under the No Action Alternative, impacts on wildlife resources would not occur.

4.5.5 Wetlands/Riparian Zones, Floodplains, and Waters of the United States

4.5.5.1 Proposed Action

4.5.5.1.1 Impacts

Toquop Area. The Proposed Action would not affect wetlands or riparian zones present at springs because these resources do not occur at the proposed sites of project features. Locations of springs in relation to project feature sites were discussed in *Section 4.4, Ground Water Resources*. The Proposed Action would affect a number of named and unnamed ephemeral washes. Named ephemeral washes that would be affected by the Proposed Action include Halfway Wash, Toquop Wash, South Fork Toquop Wash, and Sam's Camp Wash.

The proposed access road would cross approximately 36 ephemeral washes, including Halfway Wash, that either intersect or parallel the proposed roadway. Construction in the bed or banks of the ephemeral washes would potentially cause increases in erosion, contamination, hydrologic changes, or vegetation removal that would reduce the ecological and functional values of the ephemeral wash. One small ephemeral wash is located within the proposed plant site. This wash is approximately 3 feet wide and flows into the Toquop Wash. The proposed water pipeline (western alignment) would affect approximately nine ephemeral washes, including Toquop Wash, South Fork Toquop Wash, and Sam's Camp Wash. The proposed water pipeline would be located within and parallel to the streambed of the Toquop Wash at the Toquop Gap. The proposed pipeline would parallel the Toquop Wash streambed for an estimated 2,500 to 3,000 feet.

Floodplains are not expected to be affected by the Proposed Action because the area is mapped as "Zone D," which is defined as "areas of undetermined, but possible, flood hazards."

With the implementation of best management practices (BMPs) during construction, and other measures described in *Appendix B, Standard Construction and Operation Procedures,* and summarized below, impacts on waters of the United States, including ephemeral washes, would be minor.

Pah Rah Parcel. No perennial water bodies, waters of the United States, wetlands, other aquatic areas, or riparian vegetation are present within the Pah Rah parcel and, therefore, would not be affected by the Proposed Action.

4.5.5.1.2 Mitigation. No mitigation is proposed.

4.5.5.1.3 Cumulative Impacts. Minor impacts have previously occurred on the ephemeral washes within and adjacent to the existing access road and powerline right-of-way. These minor impacts are associated with the construction of the roadway, the gas pipeline, and powerlines. Some cumulative effects on ephemeral washes may occur from the expansion of the Kern River Gas Pipeline. These are expected to be minor because the expansion will add only 20 feet to the existing pipeline right-of-way. Standard construction and operating procedures and best management practices of both the Toquop Energy Project and the Kern River Gas Pipeline Expansion will further minimize impacts to ephemeral washes.

4.5.5.2 Alternative 1

4.5.5.2.1 Impacts. Alternative 1 would not affect wetlands or riparian zones present at springs. These resources do not occur at the immediate site of project features, although a number of springs are within approximately 100 yards of the eastern water pipeline alignment (see *Section 4.3, Surface Water Hydrology,* for discussion of spring locations). Alternative 1 would affect a number of named and unnamed ephemeral washes. Named ephemeral washes that would be affected include Halfway Wash, Toquop Wash, and Sam's Camp Wash.

As with the Proposed Action, the proposed access road would impact approximately 36 ephemeral washes, including Halfway Wash, that either intersect or parallel the proposed roadway. One small ephemeral wash is located within the southern plant site. This wash is approximately 3 feet wide and flows into Toquop Wash.

The proposed water pipeline (eastern alignment) would affect approximately 54 ephemeral washes, including Toquop Wash and Sam's Camp Wash. The proposed pipeline would cross Toquop Wash below the confluence of Toquop Wash and South Fork Toquop Wash. Several drainages are present in the vicinity of the proposed crossing of the Toquop Wash.

With the implementation of BMPs during construction and mitigation measures (see *Appendix B*), impacts on waters of the United States would be minor.

No impacts would occur on the Pah Rah parcel.

4.5.5.2.2 Mitigation. No mitigation is proposed.

4.5.5.2.3 Cumulative Impacts. Cumulative impacts would be the same as those described for the Proposed Action.

4.5.5.3 Alternative 2

4.5.5.3.1 Impacts. Alternative 2 would not affect wetlands or riparian zones present at springs, although the utility corridor would pass near a number of springs, as described for the water pipeline corridor in Alternative 1. Alternative 2 would affect a number of named and unnamed ephemeral washes. Named ephemeral washes that would be affected include Halfway Wash, Toquop Wash, and Sam's Camp Wash.

The proposed access road, which would extend from I-15 to the northern plant site, would impact approximately 83 ephemeral washes—including Halfway Wash, Toquop Wash, and Sam's Camp Wash—that either intersect or parallel the proposed roadway. Based on a review of the USGS topographic maps, no ephemeral washes are present within the proposed plant site.

The proposed utility alignment would affect approximately 54 ephemeral washes, including Toquop Wash and Sam's Camp Wash. These washes also would be affected by portions of the proposed access road. The proposed utility alignment would cross the Toquop Wash below the confluence of the Toquop Wash and the South Fork Toquop Wash. Several drainages are present in the vicinity of the proposed crossing of the Toquop Wash.

With the implementation of BMPs during construction and mitigation measures (see *Appendix B*), impacts on waters of the United States would be minor.

No impacts would occur on the Pah Rah parcel.

4.5.5.3.2 Mitigation. No mitigation is proposed.

4.5.5.3.3 Cumulative Impacts. Cumulative impacts would be the same as described for the Proposed Action.

4.5.5.4 No Action Alternative

Under the No Action Alternative, no impacts on wetlands or riparian zones, ephemeral washes, or floodplains would occur.

4.6 Air Quality and Noise

4.6.1 Air Quality

4.6.1.1 Proposed Action

The following discussion addresses potential air quality impacts associated with project development on the Toquop parcels. No adverse air quality impacts on the Pah Rah parcel would occur as a result of the land exchange. Converting the Pah Rah parcel to public administration would reduce development potential on the parcel and the potential for related contributions to airborne emissions.

4.6.1.1.1 Overview

Construction. The Proposed Action would involve two distinct construction phases that have potential for impacts on air quality. The first is the construction of the pipeline that would supply water to the facility. The second is the construction of the power plant, including associated facilities such as the access road and substation. During construction, temporary and localized increases in ambient concentrations of NOx, CO, SO_2, VOCs, and PM10 would result from exhaust emissions of worker vehicles, heavy construction equipment, diesel generators, and other machinery and tools. In addition, fugitive dust emissions would result from excavation and earthwork.

For the duration of construction activities, actively disturbed areas would be stabilized through the use of wet suppression. Surfactants may be used to aid in wet suppression, thereby reducing the volume of water required to effectively treat the site. Disturbed areas of the site, including storage piles not being actively used for a period of 1 week or longer, would be stabilized as appropriate to minimize dust emissions. Active stabilization may not be required if soil moisture or natural crusting is sufficient to limit ambient impacts.

Bulk material stored onsite would be actively wetted during unloading as needed to minimize ambient impacts. It is anticipated that the majority of the material would be used onsite upon arrival. Should bulk materials require onsite storage for an extended period of time, the application of active wet suppression or the installation of a porous wind fence would be used as necessary to minimize fugitive dust generation.

Traffic passing from unpaved surfaces to paved roadways would create both mud and dirt deposits on the road and blowing dust from passing vehicles. Onsite equipment tire washing, for equipment that would leave the site and travel on paved roads, would be implemented as necessary to mitigate this potential source of fugitive dust.

Particulate emissions occur whenever a vehicle travels across an unpaved surface. Many of the heavily traveled unpaved surfaces, such as onsite access roads, would be covered with gravel and watered as necessary to minimize dust generation.

Onsite fugitive dust emissions would be limited by reducing vehicle speeds and a combination of active and passive dust suppression measures. Additional mitigation practices could include the following:

Where practical, onsite employee parking, construction offices, and equipment and material laydown areas would be located near the main entrance to minimize onsite vehicle traffic.

Onsite access roads, parking lots, and laydown areas would be maintained with a gravel cover to the maximum extent practical.

Traffic off maintained onsite access roads would be restricted and a posted speed limit of 15 miles per hour would be enforced to minimize emissions from unpaved road segments.

Unpaved road segments would be watered at least once daily when precipitation has not occurred. Additional watering of unpaved surfaces may be undertaken whenever it is necessary to prevent ambient impacts.

Gaseous emissions from mobile sources would be minimized by proper maintenance and tune-up of equipment and by limitation of the equipment used to newer equipment, which meet air emission standards for emissions of gaseous pollutants.

For this study, a very conservative emission estimate was prepared using the emission factor for generalized construction activities from the California Air Resources Board (CARB) *Emission Inventory Procedural Manual* (CARB, 1997). This estimation methodology was accepted by NDEP BAQ. Controlled emissions based on this factor are 0.11 ton per active acre per month of PM10 based on 8 hours per day of construction activities. This factor was scaled up to account for up to 9 hours per day of construction activity at the Toquop parcel.

The proposed power plant, switchyard, equalization and evaporation ponds, associated facilities, and a lay-down area would involve disturbance of approximately 100 acres. The access road and staging area would involve the disturbance of approximate 236 acres. Well, storage tank, and pipeline construction together with staging areas would add an additional 113 acres. Collectively, the total construction area to be disturbed is estimated to be 449 acres.

Based on an analysis of specific construction plans, it was estimated that a maximum of 35 percent of the plant area would be disturbed by activities on any given day. Additionally, it was estimated that the access road construction would cause soil disturbance in 1.5-mile sections (only 1.5 miles of the dirt access road would be disturbed at any one time before paving), that only one water well would be completed at any one time, and excavation and soil disturbance for the water pipeline would occur in 2-mile sections. The resultant maximum short-term PM10 emissions considering these factors would be 44.6 pounds per hour (lb/hr) from the power plant and evaporation pond area, 27.5 lb/hr from the wellfield and associated pipeline, and 10.4 lb/hr from the access road.

In addition to the fugitive dust emissions, during construction on-road and off-road vehicles would generate gaseous exhaust emissions. Mobile emissions are a function of hours of operation, vehicle speed, vehicle type, and fuel burned. Tables 4-1 and 4-2 summarize the total mobile emissions of CO, NOx, PM10, and SO_2 that would be generated during the construction phase.

TABLE 4-1
Emissions During the Construction Phase—Short-Term Rates
Proposed Action

	Particulate (PM10) (lb/hr)	Carbon Monoxide (lb/hr)	Sulfur Dioxide (lb/hr)	Nitrogen Oxides (lb/hr)
Power plant	45.72	7.39	5.90	39.23
Access road	11.78	9.87	9.07	13.91
Water pipeline	14.98	3.28	2.72	3.97
Wells	1.6	2.54	2.34	2.27

TABLE 4-2
Emissions During the Construction Phase—Total
Proposed Action

Phase of Construction	Carbon Monoxide (tons)	Nitrogen Oxides (tons)	Sulfur Dioxide (tons)	Particulate (PM10) (tons)
Power plant	16.7	73.0	10.6	303.5
Access road	3.5	19.0	3.2	61.3
Water pipeline	0.9	4.3	0.7	33.1
Wells	3.6	19.3	3.3	1.3
Project Totals	**24.7**	**115.7**	**17.8**	**399.3**

Emission factors were obtained from CARB Emission Inventory for Off-Road Large Compression-Ignited (CI) Engines (greater than 25 horsepower), Appendix D—Emission Factors for Off-Road Equipment. January 2000 and EPA document AP-42, Volume II, Emission Factors for mobile Sources (EPA 1995, 5th edition and updates). This estimation methodology was accepted by NDEP BAQ.

Operations

Air Emission Sources. The Proposed Action would include construction of a combined cycle, natural gas-fired power plant. The plant would consume natural gas for the production of up to 1,100 MW of electricity.

The majority of the natural gas consumed by the plant would be fired in combustion turbines, which are similar to large jet engines. The hot exhaust gases would provide the energy to drive the turbine, which in turn would drive generators to produce electricity. Each combustion turbine/generator pair is referred to as a combustion turbine generator.

The waste heat in the turbine exhaust gas would be directed to a heat recovery steam generator to produce steam for the production of additional electricity. The heat recovery steam generator functions by passing the hot exhaust across a bank of metal tubes. Water inside of the tubes is thus heated by the exhaust to produce steam, which in turn drives another turbine, which in turn drives another generator to produce electricity. This turbine/generator pair is referred to as a steam turbine generator.

Heat recovery steam generators are often equipped with "duct burners," which are burners that combust additional fuel, further raising the temperature of the combustion turbine exhaust. The hotter exhaust is used to produce additional steam, allowing the steam turbine generator to produce additional electricity.

The proposed Toqoup facility would include four General Electric Frame 7FA combustion turbine generators. Each combustion turbine generator would be paired with one heat recovery steam generator equipped with 300 MMBtu/hr duct burners. Two heat recovery steam generators would be paired with each of two steam turbine generators; thus the steam from the four heat recovery steam generators would be delivered to two steam turbine generators. The Toquop combustion turbine generators and duct burners would be fired exclusively with natural gas.

The facility would also include two auxiliary boilers, which would be used to provide steam to preheat portions of the heat recovery steam generator and steam turbine generator. This auxiliary steam allows a faster and more efficient plant startup, and allows the heat recovery steam generator to be kept hot during brief maintenance outages. The Toqoup auxiliary boilers would be fired exclusively with natural gas.

Other sources of air emissions would result from equipment used to support the power plant. Four fuel preheaters (one per combustion turbine generator) with a rated heat input of 5 MMBTU would be used to re-vaporize any liquids that condense in the natural gas after the gas is reduced from pipeline pressure to burner pressure. Two diesel fired emergency generators would be used to provide power to protect critical equipment during plant outages in the event that grid power is also lost. A diesel-fired pump would be used to provide water for fire protection. Two cooling towers of eight to ten cells each would be used to provide cooling water to the surface water condensers.

The combustion turbine generators, duct burners, auxiliary boilers, generators, and fire pump would all cause air emissions of the criteria air pollutants nitrogen oxides (NO_x), carbon monoxide (CO), sulfur dioxide (SO_2), small particulate matter (PM10), and volatile organic compounds (VOCs). Minor quantities of hazardous air pollutants (HAPs) such as formaldehyde and benzene would also be emitted. The cooling towers will cause emissions of PM10.

Air Emission Controls. The facility would utilize a selective catalytic reduction (SCR) system for the control of NO_x emissions from the combustion turbine generators and duct burners. SCR technology uses ammonia, in the presence of catalyst, to react NO_x to elemental nitrogen (N_2). The SCR systems of the Proposed Action would be designed to control the combustion turbine generator/duct burner NO_x to 2.5 parts per million by volume, on a dry basis, corrected to 15 percent oxygen (ppmvd @ 15% O_2).

A small stoichiometric excess of ammonia must be added in order to control the NO_x to the target control concentration; this excess ammonia is then exhausted with the combustion turbine generator/duct burner exhaust and is referred to as "ammonia slip." When the SCR catalyst is new, ammonia slip is very small; ammonia slip from a new SCR system is typically less than 1 part per million by volume on a wet basis (ppmvw). After repeated use the catalyst loses reactivity, and additional stoichiometric excess of ammonia must be injected in order to meet the NO_x emission limits, resulting in additional ammonia slip. Eventually the catalyst is replaced, lowering ammonia slip to the original levels. For the Proposed Action, catalyst would be replaced when ammonia slip reaches 10 ppmvw.

The combustion turbine generators and other combustion sources would also use modern engineering and computer controls to minimize the emissions of other pollutants. After NO_X, CO is the other primary pollutant of concern from natural gas fired power plants; maximum CO emissions from Toquop combustion turbine generators would be 10 ppmvd @

15% O_2. The cooling towers would utilize highly efficient drift eliminators to minimize PM10 emissions.

Magnitude of Emissions. The emissions from the Toquop facility, and the use of air emission controls, would be regulated by various state and federal air pollution permits. In particular, the facility must apply for and obtain a permit under the Prevention of Significant Deterioration (PSD) program, which is required by the federal Clean Air Act but is administered in the State of Nevada by the Nevada Department of Environmental Protection.

The maximum emissions of criteria air pollutants from the facility, at the limits requested in the PSD permit application, are shown in Table 4-3. Emission data upon which these limits were based include turbine manufacturer's emission estimates, data from the USEPA "AP-42" document, and engineering experience from other plants. Toquop Energy Inc. would be required to verify compliance with these emission limits under the terms of the PSD air permit. Because federally enforceable limits on the emissions from the facility are being requested via the PSD permit, these rates also represent the potential to emit (PTE) of the facility.

Estimated maximum emissions of HAPs are shown in Table 4-4. These emissions were estimated based on source test data compiled in the CARB California Air Toxic Emission Factor (CATEF) database. The use of CATEF factors as a basis for estimating plant emissions was accepted by NDEP BAQ.

TABLE 4-3
Criteria Air Pollutant Potential Emissions for the Proposed Action, Alternative 1, and Alternative 2

Pollutant	Single Combustion Turbine Generator/ Duct Burners On	Fuel Preheater (per unit)	Auxiliary Boiler (per unit)	Cooling Tower (per cell)	Emergency Fire Pump	Total Facility[a]
NO_x (lb/hr)[b]	19.19	0.25	1.40	—	3.91	108.5
NO_x (TPY)[c]	84.05	1.10	2.8	—	0.98	355.91
CO (lb/hr)	54	0.46	2.92	—	0.17	230.33
CO (TPY)	236.52	2.01	5.84	—	0.04	967.48
SO_2 (lb/hr)	11.44	0.03	0.24	—	0.39	47.57
SO_2 (TPY)	50.11	0.13	0.48	—	0.10	202.23
PM10 (lb/hr))	24.00	0.10	0.20	0.17	0.04	100.54
PM10 (TPY)	105.12	0.44	0.40	0.73	0.01	434.97
VOC (lb/hr)	4.22	0.24	0.16	—	0.13	19.37
VOC (TPY)	18.47	1.05	0.32	—	0.03	79.04

[a] Includes emissions from four single combustion turbine generators and insignificant activities.
[b] Pounds per hour
[c] Tons per year

TABLE 4-4
Hazardous Air Pollutant Potential Emissions for the Proposed Action, Alternative 1, and Alternative 2

Pollutant	Potential to Emit (pounds/hour)*	Potential to Emit (tons/year)*
Benzene	0.61	2.62
Formaldehyde	0.80	3.47
1,3-Butadiene	0.0014	0.0036
Acetaldehyde	0.36	1.53
Acrolein	0.070	0.30
Ethylbenzene	0.061	0.27
Hexane	1.38	6.04
Naphthalene	0.0074	0.026
Propylene oxide	0.28	1.24
Toluene	0.38	1.63
Xylene (m,p)	0.27	1.18
Xylene (o)	0.14	0.59
Xylene (total)	0.13	0.53
Total Hazardous Air Pollutants	**4.50**	**19.4**

*Controlled emissions including insignificant/exempt activities.

4.6.1.1.2 Impacts

Construction. As discussed above, various control measures would be used to minimize impact of construction-related emissions. Because of these measures to prevent fugitive dust and the minimum vehicle emissions, the potential impacts resulting from construction activities at the proposed site would occur only over a limited geographic area and only for a limited time. After site preparation is complete, foundations have been constructed, and mitigation measures such as covering of traffic routes with gravel have been implemented, emissions would be very low. A Class II area impact analysis was completed, based on the emission rates described above and using the SCREEN3 dispersion model. This analysis demonstrates that federal and state ambient air quality standards would not be exceeded at any time during the construction phase. All predicted construction impacts are less than allowable standards. Modeled construction impacts for the power plant, access road, pipeline, and wellfield are presented and compared to ambient air quality standards in Tables 4-5 through 4-8. Pollutant concentrations in these tables and some subsequent tables are expressed as micrograms per cubic meter (μg/m^3).

TABLE 4-5
Estimated Reasonable but Conservative Impacts for Proposed Action Power Plant Construction

Pollutant	Maximum 1-Hour Predicted Impacts ($\mu g/m^3$)	Averaging Period	Scaling Factor	Maximum Predicted Impacts ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)
Nitrogen dioxide	274.9	Annual	0.1	27.5	100
Carbon dioxide	51.8	8-hour	0.7	36.2	NA
		1-hour	1.0	51.8	NA
Sulfur dioxide	41.3	Annual	0.1	4.1	80
		24-hour	0.4	16.5	365
		3-hour	0.9	37.2	1,300
PM10*	320.3	Annual	0.1	41.0	50
		24-hour	0.4	138.3	150

*Maximum predicted PM10 impacts include background of 9 $\mu g/m^3$ (annual average) and 10.2 $\mu g/m^3$ (24-hour average)

TABLE 4-6
Estimated Reasonable but Conservative Impacts for Proposed Action Access Road Construction

Pollutant	Maximum 1-Hour Predicted Impacts ($\mu g/m^3$)	Averaging Period	Scaling Factor	Maximum Predicted Impacts ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)
Nitrogen dioxide	144.3	Annual	0.1	14.4	100
Carbon dioxide	102.4	8-hour	0.7	71.7	NA
		1-hour	1.0	102.4	NA
Sulfur dioxide	94.1	Annual	0.1	9.4	80
		24-hour	0.4	37.6	365
		3-hour	0.9	84.7	1,300
PM10*	122.3	Annual	0.1	21.2	50
		24-hour	0.4	59.1	150

*Maximum predicted PM10 impacts include background of 9 $\mu g/m^3$ (annual average) and 10.2 $\mu g/m^3$ (24-hour average)

TABLE 4-7
Estimated Reasonable but Conservative Impacts for Proposed Action Water Pipeline Construction

Pollutant	Maximum 1-Hour Predicted Impacts ($\mu g/m^3$)	Averaging Period	Scaling Factor	Maximum Predicted Impacts ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)
Nitrogen dioxide	67.5	Annual	0.1	6.8	100
Carbon dioxide	55.9	8-hour	0.7	39.1	NA
		1-hour	1.0	55.9	NA
Sulfur dioxide	46.3	Annual	0.1	4.6	80
		24-hour	0.4	18.5	365
		3-hour	0.9	41.7	1,300
PM10*	255.1	Annual	0.1	34.5	50
		24-hour	0.4	112.2	150

*Maximum predicted PM_{10} impacts include background of 9 $\mu g/m^3$ (annual average) and 10.2 $\mu g/m^3$ (24-hour average)

TABLE 4-8
Estimated Reasonable but Conservative Impacts for Proposed Action Well Site Construction

Pollutant	Maximum 1-Hour Predicted Impacts ($\mu g/m^3$)	Averaging Period	Scaling Factor	Maximum Predicted Impact ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)
Nitrogen dioxide	207.8	Annual	0.1	20.8	100
Carbon dioxide	231.7	8-hour	0.7	162.2	NA
		1-hour	1.0	231.7	NA
Sulfur dioxide	214.1	Annual	0.1	21.4	80
		24-hour	0.4	85.6	365
		3-hour	0.9	192.7	1,300
PM10*	146.6	Annual	0.1	23.7	50
		24-hour	0.4	68.8	150

*Maximum predicted PM_{10} impacts include background of 9 $\mu g/m^3$ (annual average) and 10.2 $\mu g/m^3$ (24-hour average)

Operations

Dispersion Modeling Methodology. Dispersion modeling was performed using EPA-approved air quality dispersion models, which are mathematical descriptions of atmospheric diffusion and dispersion processes that can be used to predict pollutant impacts over a given area. The modeling was conducted in accordance with a dispersion modeling protocol that was submitted to and approved by the NDEP BAQ as part of the PSD process. *Appendix E, Air Quality Dispersion Modeling Methodolgy,* describes the air quality dispersion modeling methodology in detail.

Class II Area Dispersion Modeling Results. Dispersion modeling of the maximum allowable emissions from the Toquop facility was performed for NO_X, CO, PM10, and SO_2. No EPA-approved models exist for prediction of ozone impacts of a single facility.

Predicted impacts are compared to the "PSD Increment," which is the maximum allowable ambient air quality deterioration allowed under the PSD program. They are also compared to the national ambient air quality standards (NAAQS). The NAAQS are the pollutant concentrations below which, as determined by the USEPA, no adverse human health or environmental impacts are presumed to occur. Nevada has specific state AAQS, but these generally match the federal standards.

Table 4-9 presents the predicted impacts from the Proposed Action and compares them to the PSD increment and NAAQS. The values presented represent the highest results modeled at any receptor location for any of the meteorological conditions modeled.

Class II Area HAPS. Ambient impacts of hazardous air pollutant emissions were estimated by prorating the ISCST3 and CTSCREEN modeling results for the criteria pollutants based on the ratios of HAP emission rate to criteria emission rate for each pollutant and each source. Reasonable but conservative resulting 8-hour, 24-hour, and annual average HAP concentrations are presented in Table 4-10. These estimated impacts were compared to available standards (state and federal human health exposure guidelines) based on the exposure duration.

TABLE 4-9
Estimated Reasonable but Conservative Impacts for the Proposed Action

			Ambient Impact Standards	
Pollutant	Averaging Period	Maximum Predicted Impacts	PSD Increment (µg/m³)	NAAQS (µg/m³)
Nitrogen dioxide	Annual	12.6	25	100
Carbon dioxide	8-hour	51.7	NA	NA
	1-hour	406.6	NA	NA
Sulfur dioxide	Annual	0.9	20	80
	24-hour	4.5	91	365
	3-hour	21.8	512	1,300
PM10	Annual	2.1	17	50
	24-hour	9.4	30	150

TABLE 4-10
Hazardous Air Pollutant Impact Analysis

	Reasonable but Conservative Estimated Impacts								
HAP	8-Hour Average Concentration ($\mu g/m^3$)	24-hour Average Concentration ($\mu g/m^3$)	Annual Average Concentration ($\mu g/m^3$)	Nevada Average Acceptable Ambient Air Concentrations [8-hour][1] ($\mu g/m^3$)	8-hour Average Concentration Greater than Nevada AACS?	ATSDR Minimal Risk Level (MRL) [acute, 1 - 14 days][2,4] ($\mu g/m^3$)	24-hour Average Concentration Greater than ATSDR MRL	Region 9 Ambient Air PRG [chronic][3] ($\mu g/m^3$)	24-hour Average Concentration Greater than Region 9 PRG?
Formaldehyde	4.9E-01	2.8E-01	7.0E-02	7.1E+01	No	3.3E+01	No	1.5E-01	No
1,3-Butadiene	2.7E-02	1.5E-02	3.9E.03	5.2E+04	No	NA[5]	—	3.7E-03	No
Acetaldehyde	5.2E-01	3.0E-01	7.5E-02	NA[5]	—	NA[5]	—	8.7E-01	No
Acrolein	4.4E-02	2.5E-02	6.3-03	6.9E+00	No	4.1E-02	No	2.1E-02	No
Ethylbenzene	6.3E-02	3.6E-02	9.0E-03	1.0E+04	No	8.1E+02	No	1.1E+03	No
Hexane	5.2E-01	2.9E-01	7.4E-02	4.3E+03	No	NA[5]	—	2.1E+02	No
Naphthalene	1.4E-02	8.0E-03	2.0E-03	1.2E +03	No	NA[5]	—	3.1E+00	No
Propylene oxide	1.1E-01	6.1E-02	1.5E-02	NA[5]	—	NA[5]	—	5.2E-01	No
Toluene	2.9E-01	1.6E-01	4.1E-02	8.9E+03	No	8.1E+02	No	4.0E+02	No
Xylene (m,p)	1.2E-01	6.9E-02	1.7E-02	NA[5]	—	NA[5]	—	NA[5]	—
Xylene (o)	1.1E-01	6.2E-02	1.5E-02	NA[5]	—	NA[5]	—	NA[5]	—
Xylene (total)	2.2E-01	1.2E-01	3.1E-02	1.0E+04	No	8.1E+02	No	7.3E+02	No

Notes:

[1] ATSDR Toxicological Profile Information Sheets. http://www.atsdr.cdc.gov/toxpro2.html. March 2002.

[2] Agency for Toxic Substances and Disease Registry (ATSDR) Minimal Risk Levels (MRLs) for Hazardous Substances. http://www.atsdr.cdc.gov/mrls.html. March 2002.

[3] U.S. Environmental Protection Agency. Region 9 Ambient Air Preliminary Remediations Goals.

[4] ATSDR Minimal Risk Level for ethylbenzene is based on a sub-chronic (2 weeks to 1 year) exposure term.

[5] NA = value is not available for this HAP

The estimated 8-hour average HAP concentrations were compared to the 8-hour Nevada Average Acceptable Ambient Air Concentrations [AAACs] (ATSDR, 2002a; USEPA, 1997). The AAACs are from the National Air Toxics Inventory Clearing House database and are also presented in the toxicological profiles published by the Agency for Toxic Substances and Disease Registry (ATSDR). AAACs are available for 8 of the 12 HAPs.

The estimated 24-hour average HAP concentrations were compared to the ATSDR Minimal Risk Levels (MRLs) [ATSDR, 2002b]. MRLs were derived based on exposures that occur over a 1- to 14-day time frame and are available for 5 of the 12 HAPs.

The estimated annual average HAP concentrations were compared to the U.S. EPA Region 9 Ambient Air Preliminary Remediation Goals (PRGs) [USEPA, 2002]. The PRGs are based on a chronic (long-term) exposure and are derived using a target risk level of 1 x 10^{-6} (for carcinogens) or a target hazard index of 1 (non-carcinogens). PRGs are available for 10 of the 12 HAPs.

As shown in Table 4-10, none of the estimated HAP concentrations exceed the available standards, based on the appropriate exposure term. Therefore, even if residences were located in close proximity to the site, it is very unlikely that the estimated HAP concentrations would result in an unacceptable risk to the occupants of those residences. The distance of the proposed Toquop facility from any residences or business makes this analysis even more conservative.

Although, none of the air standards presented in Table 4-10 are available for m,p-xylene and o-xylene, the potential impacts can be assessed using the standards for total xylenes, which is a mixture of m,p-xylene and o-xylene. In addition, Florida, Indiana, and North Dakota have 8-hour AAAC values for m,p-xylene and o-xylene ranging from 2,170 $\mu g/m^3$ to 4,400 $\mu g/m^3$ (USEPA, 1997); however, the estimated m,p-xylene and o-xylene average 8-hour air concentrations are nearly four orders of magnitude lower than these AAACs.

Class I Area Dispersion Modeling Analysis Results. Evaluation of air emission impacts on Federal Class I areas is focused on two primary topics. First, maximum ambient concentrations of criteria pollutants are estimated and compared to Class I area ambient air quality standards and Class I area allowable increment. Second, impacts of air emissions on Air Quality Related Values (AQRVs) within the Class I area are determined. In the western United States, AQRV evaluation is typically limited to evaluation of impacts on regional haze and AQRV impacts caused by acid deposition.

A CALPUFF screening model was used to predict impacts on the Grand Canyon National Park. National Weather Service meteorological data from Las Vegas were used for this analysis. This is the nearest existing set of data.

Three additional Class I areas exist within 200 kilometers (125 miles) of the Proposed Action plant site. These are the Sycamore Canyon Wilderness Area, Bryce Canyon National Park, and Zion National Park. Because the distances to these areas are greater than the distance to the Grand Canyon National Park, the managers of these areas suggested that an analysis of potential impacts on the Grand Canyon National Park only would be adequate

(Hall, 2001; Notar, 2001). Facility impacts on the Grand Canyon National Park should exceed impacts at the other three areas.

Table 4-11 lists the maximum predicted impacts on ambient pollutant concentrations within the Grand Canyon National Park. All predicted impacts are well below PSD Class I modeling significance levels; therefore, the Proposed Action is presumed to have an insignificant impact on air quality in the area and a cumulative evaluation of the impacts on increment and NAAQS was not performed.

The CALPUFF screening analysis predicted that the reasonable but conservative impact on regional haze within the Grand Canyon National Park was a 3.5 percent change in atmospheric light extinction. In accordance with the FLAG guidance document, a facility predicted to cause a change of 5 percent or less is presumed to have an insignificant impact on visibility. Therefore, a cumulative impact analysis of impacts on the Grand Canyon National Park was not performed. The subsequent complete CALPUFF analysis predicted that the reasonable but conservative impact on regional haze within the Grand Canyon National Park was a 1.6 percent change in atmospheric light extinction.

Reasonable but conservative modeling, based on CALPUFF screening analysis of the Proposed Action impact on acid deposition in the Grand Canyon National Park indicates that the added deposition would not exceed 1.3 x 10^{-3} kilograms per hectare per year (kg/ha/yr) for nitrogen compounds and 1.3 x 10^{-3} kg/ha/yr for sulfur. These results are significantly less than the deposition analysis thresholds of 5.0 x 10^{-3} kg/ha/yr for nitrogen recommended by the 2001 FLAG *Guidance on Nitrogen Deposition Analysis Thresholds* document and 5.0x10^{-3} kg/ha/yr for sulfur, as proposed but not yet finalized by the National Park Service (NPS). Because the estimated impacts of the Proposed Action were extremely low, the Proposed Action is presumed to create an insignificant increase in the total deposition for the Grand Canyon National Park. Therefore, a more complete analysis

TABLE 4-11
Predicted Grand Canyon National Park Impacts for the Proposed Action, Alternative 1, and Alternative 2

Parameter	Averaging Period	Maximum Predicted Impact at Grand Canyon ($\mu g/m^3$)	Class I Significance Level ($\mu g/m^3$)
Nitrogen oxides (NO_x)	Annual	0.0098	0.1
Sulfur dioxide (SO_2)	Annual	0.009	0.1
	24-hour	0.078	0.2
	3-hour	0.03	1.0
PM10	Annual	0.02	0.2
	24-hour	0.17	0.3

of existing plus proposed deposition compared to the acid neutralization capacity of the Grand Canyon National Park waters was not performed.

Class II Area Visibility Impacts. As stated previously, the NPS requested an analysis of visibility impacts within the Lake Mead National Recreation Area (Notar, 2001). This included a CALPUFF analysis of impacts on regional haze and a VISCREEN analysis of discrete plume visibility impacts.

Regional Haze Impacts. The regional haze CALPUFF screening analysis predicted a reasonable but conservative 2.1 percent change in atmospheric light extinction resulting from the Proposed Action. Because this is well below the 5 percent threshold recommended in the FLAG document, no cumulative impact analysis of Lake Mead National Recreation Area regional haze was performed.

Discrete Plume Impacts. VISCREEN is a relatively simplistic Gaussian distribution model that assumes all plant emissions would form a single plume. On this basis, the four combustion turbine generator/duct burner stacks and the 16 cooling tower cells of the Proposed Action were modeled as a single plume blowing straight towards Lake Mead.

For the purpose of determining the reasonable but conservative meteorology to be used in determining discrete plume impacts, the VISCREEN guidance manual specifies that the user determine the most stable meteorological conditions occurring for at least 1 percent of the year.

For the Proposed Action, based on the Las Vegas meteorological data set used for the CALPUFF analysis, this reasonable but conservative meteorology was determined to be a "D" class stability and a 4 m/s windspeed. These data were used for the VISCREEN analysis.

No published standards exist for evaluation of discrete plume visual impacts in federal Class II areas. For federal Class I areas, the VISCREEN users' manual suggests maximum allowable color contrast ("delta E") of 2.0 for results viewed against terrain or sky, maximum allowable contrast of 0.5 for results viewed against sky, and maximum allowable contrast of 0.6 for results viewed against terrain.

For the Proposed Action, the model predicts that the reasonable but conservative color contrast and contrast, viewed against sky, would be 0.25 and -0.008, respectively, for situations where the observer is viewing the plume with the sun behind the observer, and 1.5 and 0.031, respectively, for situations where the observer is viewing the plume with the sun behind the plume. These results are well within the standards for Class I areas. The model predicts reasonable but conservative color contrast and contrast, viewed against terrain, of 0.083 and 0.01, respectively, with the sun behind the observer, and 2.3 and 0.015, respectively, with the sun behind the plume.

The model predicts that, under the right atmospheric conditions and with specific relative angles between the observer, the plume, and the sun, the total Proposed Action plant emissions merging to form a single plume could be viewed against terrain at Lake Mead National Recreation Area. Predicted results are well within Class I area standards for all other situations.

These conditions could occur, at most, for 1 percent of the year. Less than 1 percent of the Lake Mead National Recreation

Area is within the radius where these results were predicted. Furthermore, at the specified angles of sun, observer, and terrain, no elevated terrain against which the observer could view the plume exists. Therefore, VISCREEN predicts minimal impact on visibility within the Lake Mead National Recreation Area.

4.6.1.1.3 Mitigation

Construction. No mitigation is proposed.

Operation. No mitigation is proposed.

4.6.1.1.4 Cumulative Impacts

Construction. Because emissions from construction activities are frequently near-ground releases, the impacts would only occur over a limited geographic area in the immediate vicinity of the proposed facility. Construction of the Kern River Pipeline expansion (see *Section 1.8, Interrelated Projects*) would occur in the project area and create near-ground releases. It is expected that construction of the expansion will be complete or nearly complete as construction of the Toquop Energy Project begins. Cumulative effects during construction will be limited.

Operation

PSD Increment Evaluation. Under the Clean Air Act (CAA), significant deterioration of local air quality is not allowed, regardless of existing air quality and whether this deterioration would cause a violation of ambient air quality standards. This potential deterioration is estimated through the PSD Increment Evaluation.

Table 4-12 presents the surrounding facilities that were considered for inclusion in the PSD increment analysis. This list was developed based on correspondence with NDEP BAQ, Clark County Health Department, Arizona Department of Environmental Quality, and the Utah Department of Environmental Quality, and includes identified emissions sources in all airsheds where the Proposed Action is predicted to have a significant ambient impact for all or portions of the airshed. Reasonably foreseeable actions were also included, based on information available from NEPA documentation for other projects. A total of 26 other facilities were considered in the PSD increment analysis. The proposed Beaver Dam combined cycle power plant project near Littlefield, Arizona, was also identified as a reasonably foreseeable action based on its listing on the California Energy Commission web site; however, because no information was available on the magnitude of air emissions, it was not included in this analysis.

The distance of the sources from the Proposed Action range from 41 to 130 km. Some of the sources were eliminated from the analysis because they were located outside of the PSD significant impact area. This area was defined based on modeled ambient impacts of the Toquop facility; facilities located outside of the area have little chance of significantly affecting ambient air quality in the location where the Toquop facility could significantly affect ambient air quality.

Other sources were eliminated because of low emission rates. Even if located within areas where the Toquop facility could have significant impact, facilities with low emission rates are unlikely to add significantly to cumulative total impacts. A common evaluation tool used in the PSD program, the "20D" formula, was used for this screening. Specifically, for

TABLE 4-12
Regional Increment Consuming Sources

Source	Location			Emissions (tons/year)			Within SIA			Required for Analysis Per "20D" Formula		
	County	State	UTMs* (km)	PM10	SO_2	NO_x	PM10	SO_2	NO_x	PM10	SO_2	NO_x
Permitted Sources												
Chemical Lime Company	Clark	NV	687.4 E 4,025.4 N	229.1	1115.5	20.2	No	No	No	No	No	No
Las Vegas Paving	Clark	NV	687.4 E 4,025.5 N	47.7	77.2	2.2	No	No	No	No	No	No
Granite Construction	Clark	NV	687.4 E 4,025.8 N	0.9	N/A	37.5	No	No	No	No	No	No
Georgia Pacific	Clark	NV	686.8 E 4,023.9 N	268.1	1.6	49.7	No	No	No	No	No	No
Harry Allen	Clark	NV	688.2 E 4,033.3 N	130.7	36.2	300.7	No	No	No	No	No	No
Nevada Cogeneration Associates	Clark	NV	690.9 N 4,029.2 N	65.7		132.8	No	No	No	No	No	No
Duke	Clark	NV	686.4 4,028.5	495.3	83.6	505.4	No	No	No	No	No	No
Mirant Las Vegas	Clark	NV	682.9 E 4,032.1 N	223.0	18.6	379.6	No	No	No	No	No	No
Reliant Energy Arrow Canyon	Clark	NV	690.8 E 4,029.3 N	179.5	N/A	189.1	No	No	No	No	No	No
Apex Waste Management Center	Clark	NV	690.0 E 4,026.1 N	1034.8	0.0	0.0	No	No	No	No	No	No
Highway 36	Clark	NV	697.0 E 4,039.5 N	14.7	0.0	0.0	N/A	N/A	Yes	No	No	No
Royal Cement	Clark	NV	722.2 E 4,058.5 N	1456.9	N/A	1456.9	N/A	N/A	Yes	No	No	Yes

TABLE 4-12
Regional Increment Consuming Sources

Source	Location			Emissions (tons/year)			Within SIA			Required for Analysis Per "20D" Formula		
	County	State	UTMs* (km)	PM10	SO_2	NO_x	PM10	SO_2	NO_x	PM10	SO_2	NO_x
Simplot Silica Products	Clark	NV	729.2 E 4,044.4 N	N/A	N/A	66.0	N/A	N/A	Yes	No	No	No
Leavitt Read Mix	Clark	NV	728.4 E 4,047.0 N	N/A	N/A	69.5	N/A	N/A	Yes	No	No	No
Reid Gardner	Clark	NV	711.3 E 4,059.3 N	N/A	N/A	2562.0	N/A	N/A	Yes	No	No	Yes
Bear River Contractors	Washington	UT	N/A	4.9	0.3	3.8	Yes	Yes	Yes	No	No	No
Interstate Rock Products	Washington	UT	N/A	9.2	0.3	3.9	Yes	Yes	Yes	No	No	No
Western Rock Products Corporation	Washington	UT	N/A	2.3	1.6	17.0	Yes	Yes	Yes	No	No	No
St. George City Power	Washington	UT	N/A	1.8	1.6	24.9	Yes	Yes	Yes	No	No	No
Genpak Corporation	Iron	UT	N/A	0.1	0.0	0.3	Yes	Yes	Yes	No	No	No
O'Sullivan Industries Incorporated	Iron	UT	N/A	2.1	0.0	0.8	Yes	Yes	Yes	No	No	No
Western Rock Products Corporation	Western Rock Products Corporation	UT	N/A	6.3	5.0	24.7	Yes	Yes	Yes	No	No	No
United Rock Products	Clark	NV	692.8 E 4,030.1 N	666.8	N/A	N/A	Yes	No	No	No	No	No
Great Start Cement	Clark	NV	692.3 E 4,030.7 N	347.5	N/A	N/A	Yes	No	No	No	No	No
Reasonably Foreseeable Actions												
Calpine Moapa	Clark	NV	N/A	193.0	17.4	352.1	Yes	Yes	Yes	No	No	No
PG&E	Clark	NV	713.4 E 4,062.8 N	417.1	333.7	200.2	Yes	Yes	Yes	Yes	No	No

*Universal Transverse Mercator.

each pollutant, the surrounding source must have emissions (in tons per year) greater than 20 times the difference of distance between the surrounding source and the permitted source minus the radius of impact for the permitted source. In this manner, the analysis is simplified by eliminating sources that have minimal chance of creating measurable ambient impacts in the same vicinity as the permitted source.

Because the PSD increment is intended to allow evaluation of deterioration of air quality versus baseline conditions, it only includes sources that were permitted or constructed after certain baseline dates. Sources constructed prior to these baseline dates are not included in the increment analysis.

The modeling of the Toquop facility itself demonstrated Toquop carbon monoxide (CO) impacts to be less than PSD modeling significance levels. Because CO was so far below the allowable PSD increment, cumulative modeling of CO impacts was not performed.

As shown in Table 4-12, most of the sources were eliminated from the analysis either because they were located at distances from the Proposed Action that exceeded the SIA or because emissions from those sources were less than the results of the "20D" formula. Only the Reid Gardner power plant, the Royal Cement plant, and the proposed PG&E power plant had emissions of sufficient magnitude and proximity to be included in the analysis. Note that some portions of the Reid Gardner plant were constructed prior to the major source baseline data; therefore, only portions of the Reid Gardner plant are included in the increment analysis whereas the entire plant is considered in the NAAQS analysis described below.

Table 4-13 presents the results of the increment analysis. Predicted cumulative impacts for all pollutants, resulting from the Proposed Action plus surrounding sources, were less than the allowable PSD increment.

TABLE 4-13
Increment Analysis for Predicted Cumulative Impacts for the Proposed Action, Alternative 1, and Alternative 2

Pollutant	Averaging Period	Maximum Predicted Cumulative Impacts* (μg/m³)	Impact at Location of Maximum Impact (ISC dispersion model)	PSD Class II Increment (μg/m³)
Nitrogen dioxide (NO_2)	Annual	21.24	0.1	25
Carbon monoxide (CO)	8-hour	N/A	N/A	N/A
	1-hour	N/A	N/A	N/A
Sulfur dioxide (SO_2)	Annual	2.47	2.47	20
	24-hour	9.96	9.96	91
	3-hour	22.77	22.77	512
PM10	Annual	5.43	5.43	17
	24-hour	21.8	21.8	30

*Maximum predicted impacts reflect combined impacts from proposed facility and emission inventory sources.

National Ambient Air Quality Standards Evaluation. The NAAQS analysis includes all nearby emissions sources, whether or not they were constructed before baseline dates. It includes background pollutant concentrations.

The evaluation procedure is similar to that of the increment analysis. The first primary difference is that all known emission sources, whether constructed after PSD major or minor source baseline dates or not, are considered in the analysis. As with the increment analysis, some sources can be eliminated based on the "20D" formula of distance and emission rate. The other primary difference is that natural background concentrations are also to be considered.

Table 4-14 presents the sources included in the NAAQS analysis for the Proposed Action. This list was developed based on correspondence with NDEP BAQ, Clark County Health Department, Arizona Department of Environmental Quality, and the Utah Department of Environmental Quality. All sources except for the Reid Gardner power plant, Royal Cement, and the proposed PG&E power plant were eliminated based on distance or emission rates. The proposed Beaver Dam combined cycle power plant project near Littlefield, Arizona was also identified as a reasonably foreseeable action based on its listing on the California Energy Commission web site; however, because no information was available on the magnitude of air emissions, it was not included in this analysis.

Because of the remote location of the plant site for the Proposed Action, and the lack of major metropolitan areas in the vicinity, NDEP recommended that the background concentrations of NO_x and SO_2 be assumed as zero for the PSD permit analysis. Consistent with NDEP's recommendation, this analysis assumes that background concentrations for these pollutants will be small compared to the localized impacts of the Toquop project. Thus, it is assumed that any ambient concentrations of NO_x or SO_2 in the area would be from the Proposed Action or other emission sources already included in the NAAQS analysis.

For PM10, NDEP BAQ estimates background concentration to be 10.2 $\mu g/m^3$ for a 24-hour averaging period and 9 $\mu g/m^3$ for an annual averaging period. No ambient air monitors exist in the area; these values were estimated by NDEP BAQ based on data from other sites with similar climate and soils, and represent PM10 caused by windblown dust in a hot and arid region.

The modeling of the Toquop facility itself demonstrated Toquop CO impacts to be less than PSD modeling significance levels. Because CO was so far below the allowable NAAQS, cumulative modeling of CO impacts was not performed.

Table 4-15 presents the results of the NAAQS analysis. The estimated total ambient impact of the Proposed Action and all other emission sources in the vicinity, combined with background concentrations, are presented and compared to the NAAQS. For all three pollutants, under all averaging times, the reasonable but conservative impact is shown to be less than the NAAQS.

TABLE 4-14
NAAQS Regional Sources

	Location			Emissions (tons/year)			Within SIA			Required for Analysis Per "20D" Formula		
Source	**County**	**State**	**UTMs* (Km)**	**PM10**	**SO_2**	**NO_x**	**PM10**	**SO_2**	**NO_x**	**PM10**	**SO_2**	**NO_x**
Permitted Sources												
Chemical Lime Company	Clark	NV	687.4 E 4,025.4 N	2451.7	1661.3	1874.0	No	No	No	No	No	No
Las Vegas Paving	Clark	NV	687.4 E 4,025.5 N	0.9	77.2	2.2	No	No	No	No	No	No
Granite Construction	Clark	NV	687.4 E 4,025.8 N	47.7		37.5	No	No	No	No	No	No
Georgia Pacific	Clark	NV	686.8 E 4,023.9 N	268.1	1.6	49.7	No	No	No	No	No	No
Harry Allen	Clark	NV	688.2 E 4,033.3 N	130.7	1.0	300.7	No	No	No	No	No	No
Nevada Cogeneration Associates	Clark	NV	690.9 N 4,029.2 N	1.9		132.8	No	No	No	No	No	No
Duke	Clark	NV	686.4 4,028.5	495.3	83.6	505.4	No	No	No	No	No	No
Mirant Las Vegas	Clark	NV	682.9 E 4,032.1 N	223.0	18.6	379.6	No	No	No	No	No	No
Reliant Energy Arrow Canyon	Clark	NV	690.8 E 4,029.3 N	179.5		189.1	No	No	No	No	No	No
Apex Waste Management Center	Clark	NV	690.0 E 4,026.1 N	1034.8	0.0	0.0	No	No	No	No	No	No
Highway 36	Clark	NV	697.0 E 4,039.5 N	14.7	0.0	0.0	Yes	No	No	No	No	No
Royal Cement	Clark	NV	722.2 E 4,058.5 N	N/A	N/A	2004.4	Yes	Yes	Yes	No	No	Yes
Simplot Silica Products	Clark	NV	729.2 E 4,044.4 N	N/A	N/A	219.0	Yes	Yes	Yes	No	No	No

TABLE 4-14
NAAQS Regional Sources

	Location			Emissions (tons/year)			Within SIA			Required for Analysis Per "20D" Formula		
Source	County	State	UTMs* (Km)	PM10	SO_2	NO_x	PM10	SO_2	NO_x	PM10	SO_2	NO_x
Leavitt Read Mix	Clark	NV	728.4 E 4,047.0 N	N/A	N/A	222.5	Yes	Yes	Yes	No	No	No
Reid Gardner	Clark	NV	711.3 E 4,059.3 N	533.3	12587.3	18538.5	Yes	Yes	Yes	Yes	Yes	Yes
Bear River Contractors	Washington	UT	N/A	4.9	0.3	3.8	Yes	Yes	Yes	No	No	No
Interstate Rock Products	Washington	UT	N/A	9.2	0.3	3.9	Yes	Yes	Yes	No	No	No
Western Rock Products Corporation	Washington	UT	N/A	2.3	1.6	17.0	Yes	Yes	Yes	No	No	No
St. George City Power	Washington	UT	N/A	1.8	1.6	24.9	Yes	Yes	Yes	No	No	No
Genpak Corporation	Iron	UT	N/A				Yes	Yes	Yes	No	No	No
O'Sullivan Industries Incorporated	Iron	UT	N/A	2.1	0.0	0.8	Yes	Yes	Yes	No	No	No
Western Rock Products Corporation	Iron	UT	N/A	6.3	5.0	24.7	Yes	Yes	Yes	No	No	No
United Rock Products	Clark	NV	692.8 E 4,030.1 N	666.8	N/A	N/A	Yes	No	No	No	No	No
Great Start Cement	Clark	NV	692.3 E 4,030.7 N	347.5	N/A	N/A	Yes	No	No	No	No	No
Reasonably Foreseeable Actions												
Calpine Moapa	Clark	NV	N/A	193.0	17.4	352.1	Yes	Yes	Yes	No	No	No
PG&E	Clark	NV	713.4 E 4,062.8 N	0.0	0.0	0.0	Yes	Yes	Yes	Yes	No	No

*Universal Transverse Mercator.

TABLE 4-15
NAAQS Analysis for Predicted Cumulative Impacts for the Proposed Action, Alternative 1, and Alternative 2

Pollutant	Averaging Period	Maximum Predicted Cumulative Impacts* (μg/m^3)	TPP Impact at Location of Maximum Impact (μg/m^3)	Background (μg/m^3)	Maximum Predicted Impact with Background	NAAQS
Nitrogen dioxide (NO_2)	Annual	93.03	0.09	0	93.03	100
Carbon monoxide (CO)	8-hour	N/A	N/A	0	N/A	N/A
	1-hour	N/A	N/A	0	N/A	N/A
Sulfur dioxide (SO_2)	Annual	54.09	0.041	0	54.09	80
	24-hour	216.36	0.164	0	216.36	365
	3-hour	486.81	0.369	0	486.81	1,300
PM10	Annual	14.8	0.084	9	23.8	50
	24-hour	59.1	0.344	10.2	69.3	150

*Maximum predicted impacts reflect combined impacts from proposed facility and emission inventory sources.

The Proposed Action contribution to the total concentrations at all worst-case receptors would be less than 1 percent of the total. Furthermore, the worst Proposed Action impacts at any location would be small fractions of the worst-case cumulative impact.

It should be noted that, based on lack of complete data, relatively conservative assumptions were used for dispersion modeling of the surrounding sources. Data on stack parameters and pollutant emission rates were available from NDEP and Clark County, but complete data needed for accurate analysis of building downwash as affected by building dimensions were not available. Furthermore, the surrounding sources were modeled using the same hypothetical, worst-case meteorological data set as used for the Proposed Action, although actual meteorological data may have been available for the vicinity of the sources. The analysis presented is, therefore, conservative and most likely overestimates ambient impacts.

4.6.1.2 Alternative 1

4.6.1.2.1 Impacts. Predicted impacts from Alternative 1 would be equal in all respects to those estimated for the Proposed Action.

4.6.1.2.2 Mitigation. No mitigation is proposed.

4.6.1.2.3 Cumulative Impacts. All cumulative impacts from Alternative 1 plus surrounding facilities would be equal in all respects to the cumulative impacts resulting from the Proposed Action plus surrounding facilities.

4.6.1.3 Alternative 2

Emissions from Alternative 2 would be identical to those of the Proposed Action, as presented in Tables 4.6-3 and 4.6-4. Alternative 2 would therefore be subject to the PSD program, and PSD review would again be required for NO_x, SO_2, CO, and PM10.

4.6.1.3.1 Impacts

Construction. Predicted construction-related impacts from Alternative 2 would be essentially equal in all respects to those estimated for the Proposed Action. With a plant site location in the Tule Desert, Alternative 2 would require a much shorter water pipeline; however, a new transmission line the same length as the pipeline would be required. Thus, overall Alternative 2 would have impacts of equal magnitude to the Proposed Action, although the maximum impacts could occur in slightly different locations.

Operation

Class II Area Impacts. Alternative 2 is in an area of similar topography, climate, and meteorology as the Proposed Action. Maximum PM10 and SO_2 impacts from the Proposed Action were predicted to be in the East Mormon Mountains at an elevation of approximately 125 meters (410 feet) above and at a distance of 4 to 5 miles from the plant site. For Alternative 2, Jumbled Mountain reaches 243 meters (797 feet) above the plant site, begins rising above the desert at a distance of about 1 mile, and reaches its summit approximately 2 miles from the plant site. Therefore, especially given the use of the screening meteorological data set which weights all wind directions equally, it is highly likely that the predicted maximum PM10 and SO_2 impacts for Alternative 2 would be equal to or greater than the predicted maximum PM10 and SO_2 impacts for the Proposed Action. For the Proposed Action, the highest predicted NO_x impact was between the plant site and the East Mormon Mountains. Because this impact occurred on relatively level topography, it is unlikely that the maximum predicted NO_x impact for Alternative 2 would be any less than that for the Proposed Action. However, there is a chance that, given the closer proximity of mountains for Alternative 2, the predicted NO_x impacts for Alternative 2 could be higher than for the Proposed Action.

Class I Area Impacts. The Alternative 2 plant site would be 99 kilometers (62 miles) from the closest point of the Grand Canyon National Park, versus 78 kilometers (49 miles) for the Proposed Action plant site. Climate and meteorology of the two sites would be similar. Jumbled Mountain and the Tule Springs Hills are between the Alternative 2 plant site and the Grand Canyon National Park, providing complex terrain that may promote additional mixing or divert winds that may have blown from the plant site to the Grand Canyon National Park area.

It can, therefore, be assumed that the potential impacts of Alternative 2 on all pollutant concentrations within the Grand Canyon National Park would be less than Class I modeling significance levels, that Alternative 2 would cause less than the 3.5 percent change in atmospheric light extinction in the Grand Canyon National Park predicted for the Proposed Action, and that no unacceptable acid deposition within the park would occur.

Class II Area Visibility Impacts. An analysis of discrete plume visual impacts for Alternative 2 was not conducted. However the Alternative 2 plant site would be approximately 62 km (39 miles) from the

Lake Mead National Recreation Area. There are no USEPA-approved discrete plume visual impact models that are valid for distances greater than 50 km (31 miles). Therefore, it would be impossible to conduct a similar analysis for Alternative 2, and the plant would be presumed to create no discrete plume visual impacts on the Lake Mead National Recreation Area.

Alternative 2 is 24 km (15 miles) further from the Lake Mead National Recreation Area than the Proposed Action. It is therefore assumed that a CALPUFF analysis of Alternative 2 impacts on Lake Mead National Recreation Area regional haze would demonstrate a worst-case impact of less than 2.1 percent change in atmospheric light extinction, and that Alternative 2 would also be demonstrated to have insignificant impacts at the Lake Mead National Recreation Area.

4.6.1.3.2 Mitigation. No mitigation is proposed.

4.6.1.3.3 Cumulative Impacts

Construction. All cumulative impacts from Alternative 2 plus surrounding facilities during the construction phase would be equal in all respects to the cumulative impacts resulting from the Proposed Action plus surrounding facilities.

Operation

PSD Increment Evaluation. Most of the sources included in the increment analysis for the Proposed Action were in the Apex Valley or Moapa areas; the plant site for Alternative 2 would be approximately 11 miles farther away than the Proposed Action from most of these sources.

For SO_2 and PM10, the Proposed Action impacts at the receptor demonstrating the maximum increment consumption were equal to the total increment consumption (at the point of the modeled maximum increment consumption, the contribution from the surrounding sources was nearly zero; thus the Proposed Action was the sole cause of the increment consumption at that point). Given the further distance from the Apex and Moapa areas to both the Alternative 2 plant site and Jumbled Mountain, it is highly unlikely that any of the listed sources would contribute significant PM10 or SO_2 impact to increment consumption. As discussed above, it is assumed that the maximum PM10 and SO_2 impacts from Alternative 2 would be equal to or greater than those for the Proposed Action. The worst-case calculated 24-hour impact for PM10 from Alternative 2 would be 73 percent of the allowable PSD increment. Given the possible higher impacts from Alternative 2, it is possible that Alternative 2 would cause a violation the 24-hour PM10 PSD increment.

For NO_x, the highest predicted impact from the Proposed Action was 12.6 $\mu g/m^3$. The highest calculated increment consumption was 21.2 $\mu g/m^3$; the Proposed Action impact at this receptor was insignificant (0.1 $\mu g/m^3$). The allowable PSD increment for annual NO_x is 25 $\mu g/m^3$. Given the large NO_x emissions of the Reid Gardner project, it is unlikely that the Reid Gardner project would be eliminated for Alternative 2 based on the "20D" formula described for the Proposed Action. Therefore, it is assumed that the location of the receptor of highest modeled impact would still be the same, unless the Alternative 2 impacts on Jumbled Mountain would exceed 21 $\mu g/m^3$, and that the Alternative 2 contribution at that point would still be insignificant. It is highly unlikely that the modeled increment consumption would be less than 21 $\mu g/m^3$. However, in the case of a modeled high impact on Jumbled Mountain it is possible that increment consumption could be higher for Alternative 2 than for the Proposed Action, and that the allowable increment would then be exceeded.

Again, the only two reasonably foreseeable actions potentially impacting air quality in the vicinity of Alternative 2 for which data are available are the Calpine Moapa and PG&E NEG projects. Both would be located farther from Alternative 2 than the Proposed Action. It is, therefore, assumed that neither project would affect the predicted worst-case increment consumption.

NAAQS Evaluation. Most of the sources included in the NAAQS analysis for the Proposed Action were in the Apex Valley or Moapa areas, so the plant site for Alternative 2 would be approximately 11 miles farther away than the Proposed Action from most of these sources. It is assumed, therefore, that, as with the Proposed Action, all but the Reid Gardner project would be found to be insignificant in an NAAQS analysis of Alternative 2.

For the worst-case impacts predicted under the Proposed Action analysis, the Proposed Action contribution to the worst case for each pollutant and each averaging time is less than 1 percent of the total. Furthermore, the worst-case impact of the Proposed Action at any other location would also be a small fraction of the NAAQS for all pollutants.

For example, for annual NO_x, the worst-case cumulative impact of the Proposed Action plus all other sources in the vicinity was estimated to be 93.0 $\mu g/m^3$. This predicted impact occurred at a receptor in the Moapa vicinity and was based primarily on Reid Gardner emissions. The Proposed Action contribution at that receptor was 0.09 $\mu g/m^3$, or 0.1 percent of the total. The predicted worst-case impact of the Proposed Action at any other location was 12.6 $\mu g/m^3$; this location was between the proposed source location and the East Mormon Mountains.

For Alternative 2, therefore, it is highly unlikely that a NAAQS evaluation would predict any impact different from that for the Proposed Action. The Proposed Action contributions to the total were small, and by relocating the plant site farther away from the sources that created the impact, it is anticipated that the change to the worst-case impact would be trivial. Most likely, all predicted impacts would remain below the NAAQS, and the worst-case impacts would not change by more than a few percent.

Again, the only two reasonable foreseeable actions that could affect the NAAQS analysis for Alternative 2 for which data are available are the Calpine Moapa and PG&E NEG projects. Both projects would be farther from Alternative 2 than the Proposed Action. As with the Proposed Action cumulative analysis, the inclusion of these projects would not affect an Alternative 2 NAAQS analysis for NO_x or SO_2, and would add a small contribution to a PM10 NAAQS analysis. It is therefore assumed that the predicted cumulative worst-case impacts of Alternative 2, all sources in the vicinity with emission permits or submitted permit applications, plus all reasonably foreseeable actions, added to natural background concentrations, would be well below the allowable standards for all pollutants.

4.6.1.4 No Action Alternative

No new sources of air pollutant emissions would be added under the No Action Alternative. Therefore, no air quality impacts would result, and existing conditions described for the affected environment in Chapter 3 would continue.

4.6.2 Noise

This analysis addresses the potential temporary noise impacts from project construction activities, and the potential noise impacts from project operation and maintenance activities.

4.6.2.1 Proposed Action

4.6.2.1.1 Impacts. Construction of the Proposed Action would result in a temporary (26-month) direct increase in ambient noise levels at the southern Toquop power plant site, along the access road to the site, at the wellfield, and along the western water pipeline alignment. The actual increase in ambient noise levels at any given location would depend on the construction activity occurring and the number and mix of construction vehicles and equipment in use.

Construction of a power plant can generally be divided into five phases that use different types of construction equipment. The five phases are: 1) site preparation and excavation; 2) concrete pouring; 3) steel erection; 4) mechanical; and 5) clean-up. Construction equipment generates both constant and impulse noise, depending on the type of equipment. Noise levels generated by construction equipment generally range from 85 to 98 dBA at 50 feet (CH2M HILL, 2001), and would vary, depending on the construction activity. Some blasting is anticipated during construction. The increased noise level (approximately 105 dBA at a distance of 1,000 feet) would have a duration of less than 2 seconds (CH2M HILL, 1994). These construction noise levels would be temporary, and noise levels at the source would not exceed 110 dBA. No sensitive receptors would be exposed to the noise. Lincoln County's Zoning Ordinance does not include a noise ordinance (Lincoln County, 2001b).

Operation of the proposed power plant is expected to emit noise levels of approximately 60 dBA at approximately 550 feet over open land. No noise ordinances exist in Lincoln County, and no sensitive receptors would be exposed to the noise.

Because no development would occur at the Pah Rah parcel as a result of implementing the Proposed Action, no change in ambient noise levels is expected.

4.6.2.1.2 Mitigation. Because no impacts on ambient noise levels are expected from implementation of the Proposed Action, no mitigation is proposed.

4.6.2.1.3 Cumulative Impacts. The Kern River 2003 Expansion Project (see *Section 1.8, Interrelated Projects*), which would cross the Toquop parcel and is expected to be constructed in November 2002 through January 2003 in the project area, would be the closest to the Toquop Project, both geographically and in time. However, the construction periods of the Kern Project and the Proposed Action would be relatively short-term and would overlap very little, if at all. In addition, there are no sensitive receptors near the southern Toquop parcel. Therefore, the two projects would result in no cumulative impacts on ambient noise levels.

Because no impacts on ambient noise levels are expected from implementation of the Proposed Action in the Toquop area, the project would not contribute to a cumulative noise impact in the Toquop area. Because no impact on ambient noise levels would occur at the Pah Rah parcel, the Proposed Action would not contribute to a cumulative noise impact in that area.

4.6.2.2 Alternative 1

4.6.2.2.1 Impacts. Construction impacts associated with Alternative 1 would be similar to those described for the Proposed Action because the same power plant would be constructed on the same parcel as described for the Proposed Action. In addition, a water pipeline similar to that described for the Proposed Action would be installed (eastern alignment instead of western alignment), and a wellfield and an improved access road similar to those described for the Proposed Action would be constructed under Alternative 1. Further, construction noise levels would be temporary and would not exceed 110 dBA. No sensitive receptors would be exposed to the noise. Lincoln County's Zoning Ordinance does not include a noise ordinance (Lincoln County, 2001b). Operation noise levels would be the same as described for the Proposed Action.

Because no development would occur at the Pah Rah parcel from implementing this alternative, no change in ambient noise levels would be expected.

4.6.2.2.2 Mitigation. Because no impacts on ambient noise levels are expected with implementation of Alternative 1, no mitigation is proposed.

4.6.2.2.3 Cumulative Impacts. Because no impacts on ambient noise levels are expected from implementation of Alternative 1 in the Toquop area, this alternative would not contribute to a cumulative noise impact in the Toquop area. Because no impact on ambient noise levels would occur at the Pah Rah parcel, this alternative would not contribute to a cumulative noise impact in that area.

4.6.2.3 Alternative 2

4.6.2.3.1 Impacts. Construction impacts associated with Alternative 2 would be similar to those described for the Proposed Action. Although the power plant would be constructed on the northern parcel instead of the southern parcel, the same noise-generating activities would be performed during plant construction. In addition, a gas pipeline following an alignment similar to the water pipeline alignment described for the Proposed Action would be installed. An overhead high-voltage electric transmission line also would be installed, and a wellfield and improvements to the access road similar to those described for the Proposed Action would be constructed under this alternative. Construction of these project components would emit noise levels similar to those expected from constructing the Proposed Action. Construction noise levels would be temporary and not exceed 110 dBA. No sensitive receptors would be exposed to the noise. Lincoln County's Zoning Ordinance does not include a noise ordinance (Lincoln County, 2001b). Operation noise levels would be the same as described for the Proposed Action.

Because no development would occur at the Pah Rah parcel from implementing this alternative, no change in ambient noise levels would be expected.

4.6.2.3.2 Mitigation. Because no impacts on ambient noise levels are expected with implementation of Alternative 2, no mitigation is proposed.

4.6.2.3.3 Cumulative Impacts. Because no impacts on ambient noise levels are expected from implementation of Alternative 2 in the Toquop area, this alternative would not contribute to a cumulative noise impact in the Toquop area. Because no impact on ambient noise levels would occur at the Pah Rah parcel, this alternative would not contribute to a cumulative noise impact in that area.

4.6.2.4 No Action Alternative

Trends and future conditions associated with noise in the Toquop and Pah Rah areas under the No Action Alternative would be generally similar to existing conditions. Therefore, no impact on ambient noise levels would be expected with implementation of this alternative. Development may occur in the future in these areas, but the level and type of development and associated noise levels that would occur in these areas is unknown.

4.7 Visual Resources

This analysis addresses the potential temporary impacts on visual resources from project construction activities and the potential long-term impacts on visual resources from the presence of the proposed facilities.

4.7.1 Proposed Action

4.7.1.1 Impacts

The visual impacts from constructing and operating the Toquop Energy Project under the Proposed Action would depend on the degree of change to the visual resource and the viewers' responses to that change. Impacts on visual resources during project construction and operation would include the following:

- **Dust that would be generated.** Dust would be generated by earth-moving activities, construction vehicles and equipment, construction worker vehicles, materials delivery vehicles, and from areas within the construction zone that have been disturbed or where excavated material is stockpiled. Fugitive dust, if emitted in sufficient quantities and if adverse weather conditions persist, could impair or degrade existing views.
- **Presence of the construction equipment.** Depending on their values, interests, and preconceived notions and expectations, for some recreationists viewing the area, the presence of the construction equipment and its associated activities would detract from the views currently experienced. For other recreationists, the presence of the equipment and the construction activities would be interesting and would add visual variety to the landscape.
- **Increased light emitted from construction areas if nighttime construction is conducted.** Depending on their values and expectations, recreationists may not like the visual intrusion caused by construction night lighting.

Visual impacts associated with the power plant would be limited to the plant site within the Toquop parcel. Visual resource impacts would be both short- and long-term. Construction duration would be approximately 26 months.

Visual impacts associated with the water pipeline would be greatest during the project construction phase. During the construction period, an alignment area would be temporarily disrupted by machinery, excavated piles of dirt, trenches, construction vehicles and workers, and other disturbances associated with pipeline construction. However, these effects would be located in a remote area and would be temporary. Following construction, the pipeline would be buried and the surface would be restored to its original condition and grade. Therefore, no long-term changes would occur to the visual environment.

Existing visible nighttime lighting of other facilities in the region is minimal. The proposed power plant would require nighttime lighting for operational safety and security. It would create a new source of nighttime light, substantially increasing the amount of light emitted from the project site.

Levels of daytime glare at the project site are not expected to be affected because consultation with Lincoln County and the BLM would occur to determine the appropriate colors for project features. Colors would be selected that are anticipated to blend with the surrounding landscape to the extent feasible.

The southern power plant is expected to be visible from the Mormon Mountains WSA from an area due west of the southern plant site. Depending on how clear the day is, it is likely that the proposed plant would be visible from ridges in the Mormon Mountains WSA. However, at a distance of approximately 5.5 miles, individual project features may not be discernible. If there is a water vapor plume (likely to occur only on cool, moist early mornings, dissipating as the temperature increases and humidity decreases), it would likely be visible from the mountains. Although the plant is expected to be visible from this WSA, the plant's presence is not expected to detract from the recreationists' experience in the WSA.

Implementation of the Proposed Action is consistent with the designated VRM Class IV of the Toquop parcel.

The proposed land exchange (Pah Rah parcel) is consistent with the designated VRM Classes III and IV of that parcel.

No impacts on visual resources from implementing the proposed land exchange (Pah Rah parcel) would occur because no development or onsite activities would occur at the Pah Rah parcel as a result of the transaction.

4.7.1.2 Mitigation

No mitigation is proposed.

4.7.1.3 Cumulative Impacts

Cumulative impacts on visual resources could occur where project facilities or construction activities occupy the same field of view as other built facilities and further degrade the view. A cumulative impact also could occur if a viewer's perception is that the general visual quality of an area is diminished by the presence of structures or construction effects (such as disturbed vegetation), even if the new structures are not within the same field of view as the existing structures.

The proposed power plant and other future developments described in *Section 1.8, Interrelated Projects*, would alter the landscape character of the project site and regional landscape. Specifically, the Kern River 2003 Expansion Project, which would cross the Toquop parcel and is expected to be constructed in November 2002 through January 2003 in the project area, would be the closest to the Toquop Project, both geographically and in time. The EIS/EIR for the Kern Project identified mitigation for impacts on visual resources. The identified mitigation would reduce impacts to less-than-significant levels. Although the landscape would be altered with these future developments, implementation of the Proposed Action and the other projects would not result in cumulative impacts on visual resources. This is because views of the site are limited, views from I-15 are obstructed, no sensitive receptors are in the immediate vicinity, and the adjacent lands are not high-use recreation areas.

4.7.2 Alternative 1

4.7.2.1 Impacts

Impacts associated with Alternative 1 would be similar to those described for the Proposed Action.

Because no development would occur at the Pah Rah parcel from implementing this alternative, there would be no effect on visual resources.

4.7.2.2 Mitigation

No mitigation is proposed.

4.7.2.3 Cumulative Impacts

Cumulative impacts associated with Alternative 1 would be similar to those described for the Proposed Action.

4.7.3 Alternative 2

4.7.3.1 Impacts

Impacts associated with Alternative 2 would be similar to those described for the Proposed Action. The northern power plant would be visible from the Mormon Mountains and Clover Mountain WSAs and possibly from the Meadow Valley Range WSA. Alternative 2 also includes a high-voltage transmission line that would be visible from the Mormon Mountains WSA. In addition, the impact described for the Proposed Action relative to the water pipeline would not be applicable to this alternative. However, a similar impact is expected from construction of the natural gas pipeline that is part of Alternative 2.

Because no development would occur at the Pah Rah parcel from implementing this alternative, there would be no effect on visual resources.

4.7.3.2 Mitigation

No mitigation is proposed.

4.7.3.3 Cumulative Impacts

Cumulative impacts associated with Alternative 2 would be similar to those described for the Proposed Action.

4.7.4 No Action Alternative

If the areas near the Toquop and Pah Rah parcels are developed or as traffic levels increase on I-80 near the Pah Rah parcel in the future, views from and of those parcels would change. However, because no impacts on visual resources are expected from implementation of the Proposed Action in the Toquop area, the No Action Alternative would similarly not contribute to any cumulative visual resource impact in the Toquop area. Because no impact on visual resources would occur at the Pah Rah parcel, the No Action Alternative would not contribute to a cumulative visual resource impact in that area.

4.8 Recreation Resources

This analysis addresses the potential impacts on recreation resources from development of the project.

4.8.1 Proposed Action

4.8.1.1 Impacts

Transferring ownership of the 640-acre Toquop parcel from public to private would preclude the continuation of existing recreational opportunities on the 100-acre fenced portion of the parcel. However, this effect would not be substantive because recreational use is limited primarily to viewing wildflowers and birds during the spring. Some hunting (primarily to the west in the East Mormon Mountains foothills) and OHV use also occurs in the area. These opportunities would still be available on lands adjacent to the parcel. Implementation of the Proposed Action would not create a demand for recreation opportunities in the Toquop area, but it would provide improved access for individuals who wish to pursue recreation opportunities nearby.

The proposed Pah Rah land exchange would have no adverse effect on existing recreation opportunities in the Pah Rah area. Transferring ownership from private to public would make the Pah Rah parcel available for public recreation.

4.8.1.2 Mitigation

No mitigation is proposed.

4.8.1.3 Cumulative Impacts

Because no impact on recreation resources would occur in either the Toquop or Pah Rah areas, implementation of the Proposed Action would not contribute to a cumulative impact on recreation resources in either area.

4.8.2 Alternative 1

4.8.2.1 Impacts

Effects of this alternative on recreational opportunities in the Toquop area would be similar to the effects described for the Proposed Action.

Because no development would occur at the Pah Rah parcel under this alternative, no change in recreation opportunities and facilities would occur. However, transferring ownership would make this parcel available for public recreation.

4.8.2.2 Mitigation

No mitigation is proposed.

4.8.2.3 Cumulative Impacts

Because no impacts on existing recreation resources are expected from implementation of Alternative 1 in the Toquop area, this alternative would not contribute to a cumulative recreation impact in the Toquop area. Because no impact on existing recreation resources would occur at the Pah Rah parcel, this alternative would not contribute to a cumulative recreation impact in that area.

4.8.3 Alternative 2

4.8.3.1 Impacts

Effects of this alternative on recreational opportunities in the Toquop area would generally be similar to the effects described for the Proposed Action.

Because no development would occur at the Pah Rah parcel under this alternative, no change in recreation opportunities and facilities would occur. However, transferring ownership would make this parcel available for public recreation.

4.8.3.2 Mitigation

No mitigation is proposed.

4.8.3.3 Cumulative Impacts

Because no impacts on existing recreation resources are expected from implementation of Alternative 2 in the Toquop area, this alternative would not contribute to a cumulative recreation impact in the Toquop area. Because no impact on existing recreation resources would occur at the Pah Rah parcel, this alternative would not contribute to a cumulative recreation impact in that area.

4.8.4 No Action Alternative

Trends and future conditions associated with recreation in the Toquop area and Pah Rah parcel under the No Action Alternative would be generally similar to existing conditions. Therefore, no impact on recreation resources is expected with implementation of this alternative. Development may occur in the future in these areas, which would likely increase the population, and consequently, the demand for recreation opportunities and facilities in those areas. The level and type of development, and associated recreation demand that may occur, are unknown.

4.9 Land Use, Prime or Unique Farmlands, and Rangelands

This analysis addresses the potential land use conflicts from developing the proposed project.

4.9.1 Proposed Action

4.9.1.1 Impacts

Because the land adjacent to the southern Toquop parcel is primarily undeveloped, with some power production facilities located nearby, implementation of the Proposed Action would not be incompatible with existing adjacent land uses.

Because the Toquop and Pah Rah areas are not considered prime or unique farmland, no impacts on those land types would occur.

The southern Toquop parcel, which lies within the Gourd Spring Allotment, was removed from livestock management after the construction of the Gourd Spring ACEC fence. No AUMs would be lost from the exchange of this parcel. The well sites, monitoring well, and storage tank would remove up to 17 acres from current livestock use. A portion of the White Rock, Garden Springs, Summit Spring, and Snow Spring allotments may be affected, depending on the location of the well sites. The removal of these areas would not affect the management of livestock within these allotments. The water line would temporarily disturb up to 90 acres of rangeland that is currently being managed for livestock use. This disturbance would be reclaimed but would temporarily reduce the amount of available forage within the Garden Springs and Gourd Spring allotments. Because of the SOPs (see *Appendix B*) that would be followed for the installation of the water line, there would be no impact to the management of livestock. Existing range improvements would be encountered during the construction of the wells and water lines; however, SOPs would be followed in the construction of the wells and water lines to eliminate impacts.

Transfer of the Pah Rah parcel, which lies within the Olinghouse Grazing Allotment with 696 AUMs, into the public domain may facilitate grazing because the BLM would be able to integrate the management of this parcel with other adjacent public lands.

After the Caliente MFP is amended (which would identify lands as being available for exchange) and the Pah Rah/Toquop land exchange occurs, development of the Proposed Action would require obtaining a variance or special use permit to allow development of a non-agricultural facility in an agricultural-zoned area. In addition, ROWs/easements and coordination with others (relative to grazing issues) to develop the power plant and associated infrastructure would be required.

4.9.1.2 Mitigation

No mitigation is proposed beyond the fencing plan proposed in *Section 4.5.2, Vegetation and Noxious Weeds.*

4.9.1.3 Cumulative Impacts

Implementation of the Proposed Action would not contribute to a cumulative impact on land use in either the Toquop area or Pah Rah parcel.

4.9.2 Alternative 1

4.9.2.1 Impacts

Because the land adjacent to the southern Toquop parcel is primarily undeveloped, with some nearby power production facilities, implementation of Alternative 1 would not be incompatible with existing adjacent land uses.

Because the Toquop and Pah Rah parcels are not considered prime or unique farmland, no impacts on those land types would occur. Effects on livestock management would be the same as described for the Proposed Action.

Development of Alternative 1 would require obtaining a variance or special use permit to allow development of a non-agricultural facility in an agricultural-zoned area. In addition, ROWs/easements and coordination with others (relative to grazing issues) to develop the power plant and associated infrastructure would be required, similar to what would be required to develop the Proposed Action. These development requirements are not considered impacts.

4.9.2.2 Mitigation

No mitigation is proposed beyond the fencing plan proposed in *Section 4.5.2, Vegetation and Noxious Weeds.*

4.9.2.3 Cumulative Impacts

Similar to that described for the Proposed Action, because no impacts on land use are expected from implementation of Alternative 1 on either the Toquop area or Pah Rah parcel, this alternative would not contribute to a cumulative land use impact on either parcel.

4.9.3 Alternative 2

4.9.3.1 Impacts

Because the land adjacent to the northern Toquop parcel is primarily undeveloped, with some power production facilities located nearby, implementation of Alternative 2 would not be incompatible with existing adjacent land uses.

Because the Toquop and Pah Rah parcels are not considered prime or unique farmland, no impacts on those land types would occur. Effects on livestock management within the wellfield and rights-of-way would be similar to those described for the Proposed Action. The Toquop parcel would remove 640 acres of rangeland (located within the 38,823-acre Garden Springs Allotment) that is currently being managed for 2,809 AUMs of livestock use, and it would affect existing range improvements located on and surrounding the parcel. Removal of 640 acres could result in a reduction of permitted grazing use of 46 AUMs on the Garden Springs allotment.

Development of Alternative 2 would require obtaining a variance or special use permit to allow development of a non-agricultural facility in an agricultural-zoned area. In addition, ROWs/easements and coordination with others (relative to grazing issues) to develop the power plant and associated infrastructure would be required, similar to what would be required to develop the Proposed Action.

4.9.3.2 Mitigation

No mitigation is proposed.

4.9.3.3 Cumulative Impacts

No cumulative impacts would occur for this alternative.

4.9.4 No Action Alternative

Trends and future conditions associated with land use in the Toquop area and Pah Rah parcel under the No Action Alternative are expected to be generally similar to existing conditions. Therefore, no conflicts with land use are expected with implementation of this alternative. Development may occur in the future in these areas; however the level and type of future development is uncertain. Such development is expected to either be in accordance with the areas' land planning documents, or may require variances, permits, easements, ROWs, or other coordination with individual landowners. These potential development requirements are not considered impacts.

4.10 Wilderness Study Areas, Areas of Critical Environmental Concern, and Wild and Scenic Rivers

This analysis addresses the potential impacts on Wilderness Areas, WSAs, Areas of Critical Environmental Concern (ACECs), and Wild and Scenic Rivers.

4.10.1 Proposed Action

4.10.1.1 Impacts

Because the Toquop parcels are not within designated Wilderness Areas, WSAs, ACECs, or along a Wild and Scenic River, no impacts would occur. The potential wellfield abuts the Mormon Mountains WSA. Therefore, management prescriptions for those special management areas would not apply to any of the proposed project features, except for the proposed access road between I-15 and the southern Toquop parcel, which would cross the Mormon Mesa ACEC.

The proposed access road is an existing dirt road and would require improvement to construct and operate the Proposed Action. Improvements would include road widening to 24 feet, straightening in certain locations, and paving the entire 14.4-mile length of the road. This would potentially affect 216 acres of previously undisturbed lands contained in the construction right-of-way and 20 acres of staging areas that are all within the Mormon Mesa ACEC. Following reclamation, the net new long-term disturbance would be 65 acres. This ACEC is a desert tortoise Special Management Area (SMA). The ACEC is a ROW avoidance area. However, this is an upgrade to an existing road and will meet ACEC requirements.

Because the Pah Rah parcel is not located within designated Wilderness Areas, WSAs, ACECs, or along a Wild and Scenic River, no impacts would occur.

4.10.1.2 Mitigation

No mitigation is proposed.

4.10.1.3 Cumulative Impacts

Implementation of the Proposed Action would not contribute to cumulative impacts on Wilderness Areas, WSAs, or Wild and Scenic Rivers in the Lincoln County (Toquop parcel) or Washoe County (Pah Rah parcel) areas because no project features would be located in those areas.

Other than the 236 acres disturbed during construction of the access road passing through the Mormon Mesa ACEC (65 acres net new impact following reclamation), there would be no other known effects on ACECs from the Toquop Energy Project, the Lincoln County Land Act, or the Meadow Valley Land Act (see *Section 1.8, Interrelated Projects*). The potential for cumulative effects on ACECs from other power plants appears to be very low to absent.

The Mormon Mesa ACEC would also be affected by the proposed crossing of the Kern River Expansion Project. The Kern Project is the closest project to the Toquop Project, both geographically and in time.

The EIS/EIR for the Kern Project indicated that the proposed pipeline would be located adjacent to the existing Kern pipeline within a designated utility corridor for the entire crossing of the ACEC and that impacts would be less than significant.

The Pah Rah parcel is not within a designated ACEC. Therefore, that project element (the land exchange) would not contribute to cumulative impacts on ACECs in the Washoe County area.

4.10.2 Alternative 1

4.10.2.1 Impacts

Similar to the Proposed Action, implementation of Alternative 1 would not result in impacts on Wilderness Areas, WSAs, or Wild and Scenic Rivers.

Alternative 1 would use the same access road across the Mormon Mesa ACEC as the Proposed Action.

4.10.2.2 Mitigation

No mitigation is proposed.

4.10.2.3 Cumulative Impacts

Alternative 1 cumulative impacts would be the same as those described for the Proposed Action.

4.10.3 Alternative 2

4.10.3.1 Impacts

Similar to the Proposed Action, implementation of Alternative 2 would not result in any impacts on Wilderness Areas, WSAs, or Wild and Scenic Rivers.

Alternative 2 would use the same access road across the Mormon Mesa ACEC as the Proposed Action.

4.10.3.2 Mitigation

No mitigation is proposed.

4.10.3.3 Cumulative Impacts

Alternative 2 cumulative impacts would be the same as described for the Proposed Action.

4.10.4 No Action Alternative

Under the No Action Alternative, the existing access road to the transmission line would continue to be located within the Mormon Mesa ACEC.

4.11 Wastes, Hazardous and Solid

This analysis addresses the potential impacts from solid and hazardous waste generation, transport, and disposal for the Proposed Action and alternatives during project construction, operation, and maintenance activities.

4.11.1 Proposed Action

4.11.1.1 Impacts

Based on the environmental controls outlined in the standard construction and operation procedures contained in *Appendix B, Standard Construction and Operation Procedures*, there should be no environmental impacts. A Spill Prevention Control and Countermeasures Plan (SPCCP), outlined in *Appendix B,* would provide procedures for cleaning up any future spill or release.

4.11.1.2 Mitigation

No mitigation is proposed.

4.11.1.3 Cumulative Impacts

Implementation of this alternative would not contribute to cumulative hazardous or solid waste impacts.

4.11.2 Alternative 1

4.11.2.1 Impacts

There should be no hazardous or solid waste impacts associated with Alternative 1 for the same reasons as described for the Proposed Action.

4.11.2.2 Mitigation

No mitigation is proposed

4.11.2.3 Cumulative Impacts

Implementation of this alternative would not contribute to cumulative hazardous or solid waste impacts.

4.11.3 Alternative 2

4.11.3.1 Impacts

No potential hazardous or solid waste impacts should be associated with Alternative 2 for the same reasons as described for the Proposed Action.

4.11.3.2 Mitigation

No mitigation is proposed.

4.11.3.3 Cumulative Impacts

Implementation of this alternative would not contribute to cumulative hazardous or solid waste impacts.

4.11.4 No Action Alternative

If the areas near the Toquop and Pah Rah parcels are developed in the future, the potential for releases of hazardous or solid wastes associated with development and increased human activity (traffic, etc.) could increase. However, implementation of the No Action Alternative would not contribute to a hazardous or solid waste impact in the Toquop area or at the Pah Rah parcel.

4.12 Cultural and Historical Resources and Native American Religious Concerns

This section addresses potential impacts to cultural resources. Project-related impacts to resources eligible for the NRHP will be managed in accordance with the *Cultural Resources Programmatic Agreement* (Appendix C) between the BLM and Nevada SHPO for the Toquop Energy Project. This Programmatic Agreement (PA) contains stipulations to ensure that historic and prehistoric properties eligible for the NRHP will be treated to avoid or mitigate project-related effects to the extent practicable and to satisfy BLM's Section 106 responsibilities.

4.12.1 Proposed Action—Toquop Area

4.12.1.1 Impacts

Ten archaeological sites (eight prehistoric, two historic) and two isolated artifacts could be affected by construction or by change of ownership resulting from the proposed land exchange. All of these cultural resources are ineligible for the NRHP. Indirect impacts could potentially result from greater human activity in the area and possibly increased OHV use.

The BLM initiated consultation with several Southern Paiute tribes concerning both the initial land exchange proposal as well as the ensuing Toquop Energy Project. Several responding tribes made a site visit, and concerns were raised about possible effects to the Salt Song Trail, a property of traditional cultural or religious importance. Subsequently, among those tribes expressing initial concerns, one tribe indicated that this property does not extend into the project area, and another tribe indicated it has no concerns with the Proposed Action or its alternatives. Otherwise, BLM determined it had not received enough information about this property's location or its current use to assess possible project-related effects in relation to expressed concerns. No tribe has responded to BLM's request for more specific information about this property's location or possible effects on religious practitioners. Additional information on consultation is provided in Section 5.3.2, Native American Consultation.

4.12.1.2 Mitigation

No special consideration is necessary for ineligible cultural resources sites or isolated artifacts. The Proposed Action can therefore proceed with no requirements for avoidance or mitigation of historic properties.

The potential exists for buried cultural resources not visible on the surface survey, although the geomorphic context of the Proposed Action makes the presence of any such sites unlikely. This low probability of buried deposits precludes the need of archaeological monitors during construction.

Because only a records review has been conducted for the wellfield area, all well locations and associated new access routes must be subjected to a Class III survey prior to any construction, in accordance with terms of the PA.

The PA provides specific procedures for handling discoveries during construction. The BLM will ensure that any human remains, grave goods, items of cultural patrimony, and sacred objects encountered during the undertaking are treated with the respect due such materials. In accordance with the terms of the PA, human remains and associated grave goods found on public land will be handled according to the provisions of the Native American Graves Protection and Repatriation Act (NAGPRA) and its implementing regulations (43 CFR 10).

4.12.1.3 Cumulative Impacts

Cumulative impacts would be minimal for historic properties in the Proposed Action, both in combination with other neighboring projects (see *Section 1.8, Interrelated Projects*) or over the 42-year estimated lifespan of the power plant. Review of previous cultural resources projects and records for a roughly 340-square-mile area encompassing the Proposed Action and alternatives (1-mile radius) was conducted to provide a research and cultural historical context for the project. While numerous surveys for linear projects have been conducted in this area, few resulted in cultural resources finds. Site counts are higher in the neighboring East Mormon Mountains, and extensive and regionally important archaeological remains are located in proximity to the Virgin River; however, sites in the project vicinity are infrequent and do not contain data sufficient to inform regionally important research questions about prehistoric or historical lifeways. The region in general possesses low cultural resources value. No future activities related to the Proposed Action, particularly increased vehicular and human traffic, would have cumulative effects on important cultural resources, although sites ineligible for the NRHP may be destroyed.

BLM has received various information from Indian tribes related to the Proposed Action. Some have expressed no concerns for the project, others have expressed concern for preservation of archaeological resources, and some have expressed concern for a property of traditional cultural and religious importance known as the Salt Song Trail. BLM has requested more specific information as to a location of the trail and project-related effects on religious practitioners, but has received no additional data. Hence, no analysis of cumulative impacts is possible. At least one tribe has expressed to BLM that this trail does not extend into the area of Proposed Action.

4.12.2 Alternative 1—Toquop Area

4.12.2.1 Impacts

Twelve archaeological sites (eight prehistoric, two historic, two with both prehistoric and historic components) and nine isolated artifacts could be affected by construction or by change of ownership resulting from the proposed land exchange. One site is eligible for NRHP status, the rest are ineligible. All isolates are ineligible. Indirect impacts could potentially result from greater human activity in the area and possibly increased OHV use.

Issues regarding Native American concerns are the same as those for the Proposed Action.

4.12.2.2 Mitigation

For ineligible sites, mitigation for Alternative 1 would be the same as described for the Proposed Action. Regarding the one NRHP eligible site, further clarification is necessary. While located within the right-of-way, the site is approximately 30 feet above the roadbed in rock outcrop. It is unlikely that project-related activities will affect this area. Thus, no special mitigation measures are necessary at this time, but a professional archaeologist must be present to monitor construction activities near the site.

4.12.2.3 Cumulative Impacts

Cumulative impacts for Alternative 1 would be the same as described for the Proposed Action.

4.12.3 Alternative 2—Toquop Area

4.12.3.1 Impacts

Six archaeological sites (two prehistoric, two historic, two with both prehistoric and historic components) and ten isolated artifacts could be affected by construction or by change of ownership resulting from the proposed land exchange. One site is eligible for NRHP status, the rest are ineligible. All isolates are ineligible. Indirect impacts could potentially result from greater human activity in the area and possibly increased OHV use.

Issues regarding Native American concerns are the same as for the Proposed Action and Alternative 1.

4.12.3.2 Mitigation

Mitigation for Alternative 2 would be the same as that described for Alternative 1.

4.12.3.3 Cumulative Impacts

Cumulative impacts for Alternative 1 would be the same as those described for the Proposed Action and Alternative 1.

4.12.4 Pah Rah Parcel

4.12.4.1 Impacts

The land exchange would not threaten the cultural resources found in the Pah Rah parcel. Transfer of this parcel to public ownership may help ensure long-term protection/stewardship of cultural resources on the parcel. As summarized by Burke (2001):

"The proposed land exchange poses no known effects to the integrity of these cultural resources; the only result would be to move these cultural resources into a different management milieu involving various federal laws and regulations rather than local and state regulations which may now apply. No other activity or undertaking is known or anticipated at this time that has the potential to affect the integrity of these resources. No further action is recommended in relation to the proposed land exchange itself."

Burke (2001) also notes that the "BLM received no formal responses from Indian tribes following a written BLM notice of the exchange proposal and a request for information about resources of concern or interest to the tribes in the area or for any expressions of concern for the proposal generally."

4.12.4.2 Mitigation

No mitigation measures are recommended unless the cultural resource properties are disturbed.

4.12.4.3 Cumulative Impacts

There are no project-related effects on the Pah Rah parcel, and thus, no cumulative effects.

4.12.5 No Action Alternative

The Pah Rah parcel would remain in private ownership. There are no local, state, or other non-federal laws or regulation affecting how a non-federal action would take into account possible effects on cultural resources, leaving them in the same unprotected status they now have.

4.13 Indian Trust Assets

4.13.1 Proposed Action and Alternatives

Indian Trust Assets (ITAs) are legal interests in assets held in trust by the federal government for Indian tribes or individuals. The Department of the Interior Order No. 3175 requires all its bureaus and offices to explicitly address anticipated effects on ITAs in planning, decision, and operation documents.

No impacts on Indian Trust assets would occur. There are no Indian Trust assets in the project area for the Proposed Action, Alternative 1, or Alternative 2. There are no Indian Trust assets on the Pah Rah parcel.

4.13.2 No Action Alternative

The No Action Alternative would not affect Indian Trust assets.

4.14 Environmental Justice

This analysis addresses the potential impacts on minority and low-income populations in the Clark, Lincoln, and Washoe county areas.

4.14.1 Proposed Action

4.14.1.1 Impacts

Implementation of the Proposed Action would not result in any property takings from minority or low-income populations.

No health hazard impacts would be created for minority or low-income populations in Clark, Lincoln, or Washoe counties as a result of implementation of the Proposed Action. In addition, no hazardous waste impacts on minority or low-income populations in the three counties are expected from implementation of the Proposed Action.

Adverse economic impacts are not expected to accrue to Clark, Lincoln, or Washoe counties. Therefore, no adverse economic impacts on minority or low-income populations would occur.

Implementation of the Proposed Action would not require the relocation of any people. Therefore, no relocations of minority or low-income populations would occur.

4.14.1.2 Mitigation

No mitigation is proposed.

4.14.1.3 Cumulative Impacts

Because no impacts on minority or low-income populations are expected from implementation of the Proposed Action in either the Toquop or Pah Rah areas, the Proposed Action would not contribute to a cumulative impact on those populations in either area.

4.14.2 Alternative 1

4.14.2.1 Impacts

Similar to the Proposed Action, implementation of Alternative 1 would not result in any impacts on minority or low-income populations.

4.14.2.2 Mitigation

No mitigation is proposed.

4.14.2.3 Cumulative Impacts

Because no impacts on minority or low-income populations are expected from implementation of Alternative 1 in either the Toquop or Pah Rah areas, this alternative would not contribute to a cumulative impact on those populations in either area.

4.14.3 Alternative 2

4.14.3.1 Impacts

Similar to the Proposed Action, implementation of Alternative 2 would not result in any impacts on minority or low-income populations.

4.14.3.2 Mitigation

Because no impacts on minority or low-income populations are expected with implementation of Alternative 2, no mitigation would be required.

4.14.3.3 Cumulative Impacts

Because no impacts on minority or low-income populations are expected from implementation of Alternative 2 in either the Toquop or Pah Rah areas, this alternative would not contribute to a cumulative impact on those populations in either area.

4.14.4 No Action Alternative

Trends and future conditions associated with the Toquop and Pah Rah areas under the No Action Alternative would be generally similar to existing conditions. Therefore, no impact on minority or low-income populations is expected with implementation of this alternative.

4.15 Paleontological Resources

4.15.1 Proposed Action and Alternatives

Surface evaluation of the Proposed Action and its alternatives resulted in no paleontological resources. The Pah Rah parcel contains no fossil-bearing geology. There would be no impacts on paleontological resources in the Toquop area or the Pah Rah parcel.

4.15.2 No Action Alternative

The No Action Alternative would have no effect on paleontological resources.

4.16 Socioeconomics

This section presents the potential effects of the Proposed Action and alternatives on the social and economic conditions in Clark, Lincoln, and Washoe counties.

Input-output analysis was used to determine the economic impacts of project construction and operation on the combined regional economy of Lincoln and Clark counties. These two counties are assumed to be the pertinent region of influence for the economic impacts of the construction and operation of the Proposed Action and alternatives. A set of regional input-output multipliers was generated for the two-county region using the 1998 IMPLAN data set. Appendix F describes the modeling procedures and assumptions used in the analysis of the regional impacts estimated for the Proposed Action and alternatives.

The estimated project costs for construction and operation, used in the analysis, was provided by Toquop Energy. These costs were analyzed to estimate the effects on other industries in the two-county region of influence.

4.16.1 Proposed Action

4.16.1.1 Impacts

4.16.1.1.1 Economic Impacts of Construction. The total estimated construction cost of the Proposed Action is approximately $727 million, of which $178.2 million would remain in the region of influence. The total annual estimated labor cost during construction is $34 million, all of which would be spent within the region of influence. This construction labor estimate was provided by Toquop Energy and is based on the company's experience with similar projects. Table 4-16 shows the estimated project cost for the Proposed Action.

TABLE 4-16
Estimated Project Cost for the Proposed Action*

Project Feature	Construction Cost Estimate ($ Million)	Percent Local (%)	Local Construction Cost Estimate ($ Million)
Power plant	682	21	143.2
Access road	25	100	25
Water pipeline	20	50	10
Total	727	24	178.2

*Values provided by Toquop Energy

Population. Construction workers would be hired primarily from the local labor force. This includes workers from the Las Vegas metropolitan area; Mesquite and Overton, Nevada; and St. George, Utah. These workers are expected to commute daily to the project construction site. It is recognized that some construction workers may arrange for temporary residency (in rental homes or at recreational vehicle [RV] parks) in the Mesquite, Nevada, or the St. George, Utah, areas, which are relatively close to the project site. However, it is expected that the majority of construction workers would not choose to do so.

Construction workers and their families are not expected to relocate to the Clark/Lincoln County area from other areas. Workers having specialized skills may move to the area from other areas; however, the number of such workers and families is expected to be a low. Therefore, no increase to a minor increase in the population of the Clark/Lincoln County area is expected from constructing the Proposed Action.

No construction activities would be associated with the proposed land exchange. The proposed land exchange (Pah Rah parcel) would, therefore, have no effect on existing population levels in Washoe County.

Employment. According to Toquop Energy, the Proposed Action would generate peak and average construction employment levels of 950 and 500 workers, respectively, in the combined Lincoln and Clark County area. Project construction is expected to last 26 months, and annual construction payroll is estimated at $34 million. Although the unemployment rate in the region is not exceptionally high (the 2001 average was 7.2 percent in Lincoln County and 5.5 percent for Clark County), construction workers are expected to be hired from the local labor force. Thus, most construction workers would not relocate from other areas in the state or the country. Workers with specialized skills may be imported from other areas; however, this number is expected to be low when compared to the total number of construction workers required for construction of the Proposed Action.

Assuming an average annual direct construction employment level of 500 jobs, the resulting total employment generated would be about 875 jobs. This estimate is derived from the Type Social Accounting Matrix (SAM) employment multiplier of 1.75 for IMPLAN Sector 50: New Utility construction. The 875 jobs is the sum of the direct employment (500 jobs) and the indirect and induced employment of approximately 175 and 200 jobs, respectively. Indirect employment refers to the employment that is generated by the goods and services provided to construct and operate the Proposed Action. Induced employment refers to the employment generated by household spending, and includes the goods and services purchased by employees of the project.

Employment effects during the construction phase would be short-term because the jobs created would only last during the construction period. Although the effect of project construction on regional employment would be beneficial, it would increase employment in the region by less than 0.5 percent.

No construction activities would be associated with the proposed land exchange. The proposed land exchange (Pah Rah parcel) would, therefore, have no effect on existing employment levels in Washoe County.

Unemployment. The total estimated number of jobs to be created by project construction in the Clark/Lincoln County area is 875. The creation of these jobs would have a slight beneficial impact on the unemployment rate; however, because the jobs created would be temporary, the benefit would also be temporary. Therefore, the creation of these jobs is not expected to change the unemployment rate in the region. Because only a small number of construction workers are expected to reside outside of the Clark/Lincoln County area, the unemployment rates in other areas would also not be affected.

No construction activities would be associated with the proposed land exchange. The proposed land exchange (Pah Rah parcel) would, therefore, have no effect on existing unemployment rates in Washoe County.

Earnings and Income. Toquop Energy has indicated that the construction of the Proposed Action, including the power plant, access road, and water pipeline would result in an annual construction payroll of $34 million. The combined Lincoln and Clark County region Type SAM labor income multiplier for IMPLAN Sector 50: New Utility Construction is 1.46, therefore, the construction activities would generate an additional $16 million in indirect and induced labor income within the two-county region. The indirect and induced earnings were estimated to be approximately $8 million each. Because only a small number of construction workers are expected to reside outside of the Clark/Lincoln County area, earnings and income in other areas are not expected to change.

Income that would be generated during the construction phase is considered short-term because the additional income to the region would only last during the construction period. The total income effect of $50 million resulting from project construction would be beneficial, but not substantial, when compared to the two-county regional total personal income of $29 billion.

No construction activities would be associated with the proposed land exchange. The proposed land exchange (Pah Rah parcel) would, therefore, have no effect on existing earnings and income in Washoe County.

Tax Receipts. Lincoln County would collect sales and use tax on all real property purchased and delivered to the project site at a combined rate of 6.75 percent (2 percent sales tax, 2.25 percent local school support tax, 0.5 percent basic city-county relief tax, 1.75 percent supplemental city-county relief tax, and 0.25 percent infrastructure). The construction cost of the Proposed Action is estimated at approximately $727 million, of which approximately $70 million would be construction payroll. Assuming 75 percent of the remaining construction cost is for goods and materials, sales and use taxes in the range of $33 million would be generated from an estimated increase in taxable sales of about $490 million

These revenues are paid to the State of Nevada, which distributes money back to all counties. Of the cumulative sales and use tax rate of 6.75 percent, 3 percent would be disbursed back to the county of origin (Lincoln County for taxes on goods and materials delivered to the project site). Therefore, Lincoln County would be expected to collect approximately $15 million during the 26-month construction period (of the $33 million), in addition to the County's portion of the revenue generated from the remaining 3.75 percent of the cumulative tax rate. This would be a temporary (26-month) benefit to the County, increasing the County's sales tax receipts (the FY 1999-2000 sales tax was estimated at $1.7 million).

Clark County, along with all other Nevada counties, would receive portions of the remaining 3.75 percent of the sales and use tax collected on the estimated increase in taxable sales associated with project construction. This portion of sales tax redistributed to Clark County would be small relative to existing county sales and use tax receipts.

No construction activities would be associated with the proposed land exchange. The proposed land exchange (Pah Rah parcel) would result in the existing privately-owned parcel in Washoe County changing to federal (BLM) jurisdiction. Property taxes that are currently generated for Washoe County from the privately owned parcel would be eliminated with the property transfer to BLM ownership. In turn, the Toquop parcel (either the southern or northern parcel) would change to private ownership as part of the land exchange. The exchange of one parcel would generate a relatively small amount of property tax income for Lincoln County, in comparison to the $2.3 million in total property tax revenue generated in FY 1999-2000.

Housing. It is expected that the labor supply in the Clark/Lincoln County area is large enough that construction workers would not need to relocate from outside the area to construct the Proposed Action. If specialized labor is required that cannot be obtained in Clark County or Lincoln County, the number of people expected to move to the Clark/Lincoln County area from other areas is expected to be low. Housing vacancy rates are about 8.5 percent for Clark County and 29.3 percent for Lincoln County based on the 2000 Census. Because it is likely that most construction workers would be local residents, demand for housing is not expected to change as a result of project construction, and the housing vacancy rate would not be affected.

If construction workers choose to reside in RV parks in Mesquite or Overton, Nevada, nine RV parks with approximately 800 RV sites are available. If they choose to reside in RV parks in the St. George, Utah, area, six RV parks with 920 sites are available. Therefore, an adequate number of RV spaces is expected to be available to construction workers during project construction.

No construction activities would be associated with the proposed land exchange. The proposed land exchange (Pah Rah parcel) would, therefore, have no effect on existing housing levels in Washoe County.

4.16.1.1.2 Economic Impacts of Operation. Operation of the Proposed Action would result in indirect and induced economic impacts that would occur within the region of influence. These indirect and induced impacts represent permanent increases in the region's economy. The indirect and induced impacts would result from annual expenditures on payroll as well as those on operations and maintenance.

The total estimated annual operation cost of the Proposed Action is $15.5 million, of which $13 million is the fixed annual operating cost and $2.5 million is annual payroll. All of these costs are expected to remain in the region of influence.

Population. Changes in the Clark/Lincoln County population as a result of operating the Proposed Action are not expected to occur from employment opportunities generated by the project. The operation workforce is very low (estimated at 25) and is expected to be hired from the local area.

The proposed land exchange (Pah Rah parcel) would not affect Washoe County population levels over the long term.

Employment. The Proposed Action operational workforce is estimated to be 25. Operational personnel are expected to be hired from the local (Clark County and Lincoln County) workforce unless specialized expertise is required and the workers with specialized skills cannot be hired from the local area.

The 25 new jobs associated with the Proposed Action are anticipated to generate an additional 25 jobs within the two-county region. This estimate is based on the two-county region Type SAM employment multiplier of 2.03, associated with IMPLAN Sector 443: Electrical Services. Of the additional 25 additional jobs, 10 would be from indirect employment and 15 would be from induced employment. The 10 indirect jobs would be created in other industries as a result of operation of the plant by the 25 employees. The 15 induced jobs would result from the spending of earnings by the 35 people who would be employed at the 25 direct and 10 indirect jobs that would be created.

Employment effects during the operational phase would be permanent because the jobs created would remain throughout the life of the project. Although the 50 total additional jobs generated by the Proposed Action would be beneficial to the regional economy, the effect of project operation on regional employment would be minor relative to the 372,000 total employment reported for the two-county region of influence.

The proposed land exchange (Pah Rah parcel) would not affect Washoe County employment levels over the long term.

Unemployment. The total estimated number of jobs to be created in the Clark/Lincoln County area by project operation is 50. The creation of these jobs would not change the unemployment rate in the region.

The proposed land exchange (Pah Rah parcel) would not affect Washoe County unemployment rates over the long term.

Earnings and Income. Toquop Energy has indicated that the plant operation would have an annual payroll of $2.5 million. Based on this direct increase in labor income, the project operation phase would result in a total increase in labor income within the two-county region of about $3.7 million. This estimate is derived from the IMPLAN sector 433 labor income multiplier of 1.49. The indirect and induced earnings are estimated at approximately $0.6 million each

Income that would be generated during the operational phase is considered permanent because the additional income to the Clark/Lincoln County region would remain throughout the life of the project. The income effect of $3.7 million resulting from project operation would be beneficial, but not substantial, when compared to the $29 billion total personal income level of the two-county region of influence.

Tax Receipts. Lincoln County would collect sales and use tax on all real property purchased and delivered to the project site at a combined rate of 6.75 percent. The annual fixed cost operating budget is anticipated to be approximately $13 million, excluding the cost of natural gas. If the entire annual operating budget represented purchases subject to Lincoln County sales tax, this would represent a substantial increase for Lincoln County, which reported taxable sales of $25.2 million for fiscal year 1999-2000. Of the 6.75 percent combined tax rate, 3 percent is collected and disbursed directly to the collecting county. This would represent an annual payment of approximately $390,000 to Lincoln County, in addition to the county's portion of the revenue generated from the remaining 3.75 percent of the combined tax rate. This increase in sales tax receipts to Lincoln County would be a benefit. The additional sales tax revenue to Clark County would represent a minor benefit to Clark County.

According to Nevada Revised Statutes, if electricity is sold outside of Lincoln County, the project facilities would be centrally assessed in combination with any of the owners of other Nevada holdings associated with the generation and transmission of electricity (NRS 361.320). The estimated annual property tax attributed to the Proposed Action would be approximately $8 million based on project capital cost ($727 million), the assessment rate (35 percent), and the average property tax rate (3 percent). If the project is centrally assessed, the disbursement of this tax to Lincoln County and Clark County would be governed by rules established by the Nevada Tax Commission and would depend on various factors that are unknown at this time. However, any increase in property taxes that would accrue to Lincoln County would be a benefit because the county's relatively small tax base (the 1999-2000 total property tax collection was projected to be $2.3 million). Additional tax revenues from the Proposed Action to Clark County would be minor, relative to the property taxes collected in Clark County.

As discussed previously, Washoe County's property tax revenues would decrease because of the transfer of the Pah Rah parcel from private ownership to federal (BLM) jurisdiction, and Lincoln County's property tax revenues would increase because of the Toquop parcel (either the southern or northern parcel) being transferred from federal (BLM) jurisdiction to private ownership.

Other Income. Water rights that would be required to supply up to 7,000 acre-feet of water per year from the Tule Desert wellfield necessary to operate the Toquop Energy Project have been jointly applied for by Vidler Water Company, Inc. (a sister company of NLRC) and Lincoln County. Toquop Energy would lease and use these water rights for the 42-year life of the project. Lincoln County's estimated share of the leased water is up to $9 million over the life of the project.

4.16.1.1.3 Infrastructure Construction and Operation Impacts

Education. It is expected that most of the construction workers and operation personnel would be from the region of impact (Clark and Lincoln counties), and would not be relocating their families to the area. Therefore, additional school capacity would not be required in the Clark/Lincoln County area because additional students are not expected to enroll in local schools.

No construction or operation activities would be associated with the proposed land exchange. The proposed land exchange (Pah Rah parcel) would, therefore, have no effect on local public schools in Washoe County.

Police Protection. Because additional residents are not expected to relocate to the Clark/Lincoln County area to construct or operate the project, existing police protection services would continue to serve the current population. This is also true if construction workers lived at RV parks in the communities of Mesquite, Overton, or St. George.

The response time from the Pioche Sheriff Station to the Toquop area is approximately 2 hours. Because of the distance between the sheriff's department and the Toquop area, it may be difficult to adequately serve the Toquop area with existing staff. If determined necessary, an additional deputy would be hired to serve the southern portion of Lincoln County (Bradfield, 2001).

The Lincoln County Sheriffs Department has indicated that the Caliente substation is the closest to the project site (approximately 50 miles). Mutual aid agreements or an additional station may be needed to adequately serve the project (Willcock, 2001). Providing services to the project would put a strain on Lincoln County's police protection services (Carriger, 2001).

To minimize the strain that is expected to occur to Lincoln County police protection from construction and operation of the Proposed Action, measures that could include, but not be limited to, the following are included in the Proposed Action: develop a police agreement with Lincoln County and/or the City of Mesquite to provide additional personnel and services to the project site.

The method implemented to reduce the strain to either Lincoln County or the City of Mesquite police protection would be developed in consultation with and approved by the City or Lincoln County.

No construction or operation activities would be associated with the proposed land exchange. The proposed land exchange (Pah Rah parcel) would, therefore, have no effect on police protection requirements in Washoe County.

Fire Protection. Because additional residents are not expected to relocate to the Clark/Lincoln County area to construct or operate the project, existing fire protection services would continue to serve the current population. This is also true if construction workers lived at RV parks in the communities of Mesquite, Overton, or St. George.

The response time from the Alamo Fire Station to the Toquop area is approximately 2 hours. Because of the distance between the Fire Department and the Toquop area, it may be difficult to adequately serve the Toquop area with existing staff (Bradfield, 2001).

The Lincoln County Sheriffs Department stated that the Caliente fire station is the closest to the project site (approximately 50 miles). Mutual aid agreements or an additional station may be needed to adequately serve the project (Willcock, 2001). Providing services to the project would put a strain on Lincoln County's fire protection services (Carriger, 2001).

To minimize the strain that is expected to occur to Lincoln County fire protection from construction and operation of the Proposed Action, measures that could include, but not be limited to, the following are included in the Proposed Action:

- Provide onsite fire equipment and services
- Develop a fire agreement with Lincoln County and/or the City of Mesquite to provide additional personnel and services to the project site

The method implemented to reduce the strain to either Lincoln County or the City of Mesquite fire protection would be developed in consultation with and approved by the City or Lincoln County.

No construction or operation activities would be associated with the proposed land exchange. The proposed land exchange (Pah Rah parcel) would, therefore, have no effect on fire protection requirements in Washoe County.

Hospitals and Medical Care. Additional residents are not expected to relocate to the Clark/Lincoln County area to construct or operate the project. Therefore, additional hospital beds and medical care staff and equipment would not be required to serve additional population.

Lincoln County would be responsible for providing medical care in case of emergency at the project site (Carriger, 2001). Ambulance services are available in Alamo, Pioche, Caliente, and Panaca (Thompson, 2001).

The Grover Dills Hospital in Caliente is located 50 miles from the project site (Carriger, 2001). The hospital has an emergency department that handles everything but surgery. Those patients are sent to Las Vegas or St. George (Thompson, 2001).

The Dixie Medical Center, located in St. George, is about 30 miles from the project site. The medical center is currently being expanded. The medical center has an emergency department that can handle serious injuries (Lindsay, 2001).

The remoteness of the site would put a strain on existing Lincoln County medical services (Carriger, 2001).

To minimize the strain that is expected to occur to Lincoln County emergency medical services from construction and operation of the Proposed Action, measures that could include, but not be limited to, the following are included in the Proposed Action:

- Provide onsite emergency medical equipment and services
- Develop a medical aid agreement with Lincoln County and/or the City of Mesquite to provide additional personnel and services to the project site

The method implemented to reduce the strain to either Lincoln County or the City of Mesquite emergency medical services would be developed in consultation with and approved by the City or Lincoln County.

No construction or operation activities would be associated with the proposed land exchange. The proposed land exchange (Pah Rah parcel) would, therefore, have no effect on medical care requirements in Washoe County.

Water and Wastewater. It is anticipated that water required to construct the Proposed Action would be trucked from the Tule Desert wellfield to the project construction site (facility site and along the alignments) for construction activities and dust control. It would also be pumped from the Tule Desert wells and delivered to the site via pipeline after the pipeline is completed.

Water for operation of the Proposed Action over the life of the project would be obtained from up to 15 deep wells to be located in the Tule Desert. Water rights that would be required to supply up to 7,000 acre-feet of water per year from the Tule Desert wellfield necessary to operate the project have been jointly applied for by Vidler Water Company, Inc. (a sister company of NLRC) and Lincoln County. Toquop Energy would lease and use these water rights for the 42-year life of the project.

The wells drilled in the Tule Desert in Lincoln County are capable of providing water in sufficient quantities to support the project facilities during operation. Therefore, there would be no impact on existing local water purveyors. A buried pipeline (different alignments) would convey the water from the wellfield to the southern plant site for either the Proposed Action or Alternative 1. Alternative 2 would not require a pipeline to convey the water, but would still require the development of the water wells in the Tule Desert.

Portable toilets would be available at the project site and along the alignments for construction workers during construction of the Proposed Action. Sanitary wastes would be treated onsite during project operation.

Because additional residents are not expected to relocate to the Clark/Lincoln County area to construct or operate the project, additional water and wastewater systems would not be required as a result of implementing the project.

No construction or operation activities would be associated with the proposed land exchange. The proposed land exchange (Pah Rah parcel) would, therefore, have no effect on water and wastewater facilities in Washoe County.

Natural Gas. Natural gas would not be required to construct the Proposed Action.

Because workers are not expected to relocate to the area from outside the Clark/Lincoln County area to construct or operate the Proposed Action, additional residents are not expected to move to the area. Therefore, natural gas demand is not expected to increase as a result of the Proposed Action. This would also be true if construction workers lived at RV parks in the communities of Mesquite, Overton, or St. George.

Negotiations are underway with the Kern River Gas Transmission Company regarding interconnecting with the natural gas pipeline. The Kern River Gas Transmission Company has adequate capacity in the 36-inch Kern River pipeline that crosses the southeast corner of the southern Toquop parcel to supply gas for operation of the Proposed Action.

No construction or operation activities would be associated with the proposed land exchange. The proposed land exchange (Pah Rah parcel) would, therefore, have no effect on natural gas providers in Washoe County.

Telephone. Because no increase in population is expected as a result of the project, construction and operation of the Proposed Action is not expected to affect telephone services in the Clark/Lincoln County area. This is also true if construction workers lived at RV parks in the communities of Mesquite, Overton, or St. George. Communications during construction would be accomplished via a microwave system that would be constructed at the power plant site.

No construction or operation activities would be associated with the proposed land exchange. The proposed land exchange (Pah Rah parcel) would, therefore, have no effect on telephone service providers in Washoe County.

Electricity. Because workers are not expected to relocate to the area from outside the Clark/Lincoln County area to construct or operate the Proposed Action, additional residents are not expected to move to the area. Therefore, electrical demand is not expected to increase as a result of the Proposed Action. This is also true if construction workers lived at RV parks in the communities of Mesquite, Overton, or St. George.

No construction or operation activities would be associated with the proposed land exchange. The proposed land exchange (Pah Rah parcel) would, therefore, have no effect on electricity providers in Washoe County.

4.16.1.2 Mitigation

No mitigation is proposed because no adverse impacts are expected with implementation of the Proposed Action.

No impacts in Washoe County on the economic variables or community infrastructure are expected. Therefore, no mitigation is required.

4.16.1.3 Cumulative Impacts

Both the Proposed Action and the other projects planned in the Clark/Lincoln County region identified in *Section 1.8, Interrelated Projects* (the Mesquite Land Act, the Moapa/Paiute Energy Center, the Meadow Valley Generating Project, the Lincoln County Land Act, and the Kern River Gas Pipeline) would generate short-term and long-term employment, income, and tax base opportunities. These projects would also result in additional demand on police protection, fire protection, and emergency medical services.

Depending on the number of laborers required, the construction time frames of these projects, and the types of skills required by the laborers to construct these projects, it is possible that development in the Clark/Lincoln County area may require importing labor from outside the two-county area if a shortage of skilled laborers occurs. If laborers (construction or operation) are imported from outside the two-county area and they relocate to the Clark/Lincoln County area, then housing and associated infrastructure would be required for those workers and their families.

Employment opportunities for the workers (construction laborers and operations staff) would positively contribute to their personal earnings and to the revenues of the two counties. In addition, as more land is developed, more tax revenues would be generated for the Clark/Lincoln County area.

Because each project would likely generate construction jobs that would be temporary, the combined projects would not likely change in the long-term unemployment rate of the region. However, additional employment opportunities in the Clark and Lincoln County areas are a benefit to the individuals employed and to the local economy, even if only for a short-term period.

Therefore, the Proposed Action, when combined with the other projects planned in the Clark/Lincoln County area, would contribute to cumulative socioeconomic impacts (both beneficial and adverse) in the two-county region. It should be noted, however, that the project's incremental addition to these cumulative impacts is minimal.

Because the proposed land exchange in the Pah Rah area would not result in impacts on Washoe County population, employment, unemployment, earnings and income, tax receipts, housing, and community infrastructure, it would not contribute to cumulative social and economic impacts in Washoe County.

4.16.2 Alternative 1

4.16.2.1 Impacts

4.16.2.1.1 Construction Impacts. The effects on employment, unemployment, income, and tax receipts associated with Alternative 1 would be the same as described for the Proposed Action because the estimated construction labor force requirements, labor payroll, and construction costs are the same as those assumed for the Proposed Action. In addition, the impacts on population, housing, and community infrastructure would be the same as described for the Proposed Action.

For the Pah Rah parcel, the impacts associated with Alternative 1 would be the same as described for the Proposed Action—no impacts are expected in Washoe County.

4.16.2.1.2 Operation Impacts. The effects on employment, unemployment, income, and tax receipts associated with Alternative 1 would be the same as described for the Proposed Action because the operation costs and labor requirements for both alternatives are estimated to be the same. In addition, the impacts on community infrastructure would be the same as described for the Proposed Action.

For the Pah Rah parcel, the impacts associated with Alternative 1 would be the same as described for the Proposed Action; that is, no impacts are expected in Washoe County.

4.16.2.2 Mitigation

Because no impacts are expected with implementation of Alternative 1, no mitigation is proposed.

Because no impacts are expected in Washoe County from the proposed Pah Rah land exchange, no mitigation is required.

4.16.2.3 Cumulative Impacts

Alternative 1, when combined with the other planned projects in the two-county region, would contribute to cumulative socioeconomic impacts in the Clark/Lincoln County area, similar to those described for the Proposed Action. In addition, the contribution to cumulative impacts on the economy and community infrastructure from implementation of Alternative 1 would be similar to that described for the Proposed Action.

Because the proposed land exchange in the Pah Rah area would not result in impacts on Washoe County population, employment, unemployment, earnings and income, tax receipts, housing, and community infrastructure, it would not contribute to cumulative social and economic impacts in Washoe County.

4.16.3 Alternative 2

4.16.3.1 Impacts

4.16.3.1.1 Construction Impacts. The total estimated construction cost for Alternative 2 is approximately $763 million, of which $205.2 million would remain in the region of influence. The total annual estimated labor cost during construction is $34 million, all of which would be spent within the region of influence. Table 4-17 shows the estimated project cost for Alternative 2.

Population. The effects on population in the Clark/Lincoln County area and in Washoe County from construction of Alternative 2 would be the same as described for the Proposed Action.

Employment. Toquop Energy has indicated that Alternative 2 would generate estimated peak and average construction employment of 950 and 500, respectively. Project construction is expected to last 26 months. Although the unemployment rate in the region is not exceptionally high (the 2001 average unemployment rate was 7.2 percent in Lincoln County and 5.5 percent in Clark County), construction workers are expected to be hired primarily from the local labor force. Thus, most construction workers would not relocate from other areas in the state or the country. Workers with specialized skills may be imported from other areas; however, this number is expected to be low compared to the total number of construction workers required to construct this alternative.

Although the total cost associated with the construction of Alternative 2 would be somewhat higher than the Proposed Action, the estimated construction labor force is anticipated to be the same as for the Proposed Action. Therefore, the indirect and induced employment would be the same as those reported for the Proposed Action (a total temporary increase in employment of about 875 jobs).

TABLE 4-17
Estimated Project Cost for Alternative 2*

Project Feature	Construction Cost Estimate ($ Million)	Percent Local (%)	Local Construction Cost Estimate ($ Million)
Power plant	682	21	143.2
Access road	43	100	43
Gas pipeline	15	50	7.5
Transmission line	23	50	11.5
Total	763	27	205.2

*Values provided by Toquop Energy.

No construction activities would be associated with the proposed land exchange. The proposed land exchange (Pah Rah parcel) would, therefore, have no effect on existing employment levels in Washoe County.

Unemployment. The total estimated number of jobs that would be created by project construction in the Clark/Lincoln County area is 875. The creation of these jobs would have a slight beneficial impact on the unemployment rate; however, because the jobs created would be temporary, the benefit would also be temporary. Therefore, the creation of these jobs is not expected to change the unemployment rate in the region. Because only a small number of construction workers are expected to reside outside of the Clark/Lincoln County area, the unemployment rates in other areas would also not be affected.

No construction activities would be associated with the proposed land exchange. The proposed land exchange (Pah Rah parcel) would, therefore, have no effect on existing unemployment rates in Washoe County.

Earnings and Income. Similar to the employment impacts, because the anticipated construction labor force requirements and payroll would be the same as for the Proposed Action, the total labor income would be the same as for the Proposed Action (a temporary annual increase of about $50 million during the construction period). Because only a small number of construction workers are expected to reside outside of the Clark/Lincoln County area, earnings and income in other areas are not expected to change.

Income generated during the construction phase would be considered short-term because the additional income to the region would only last during the construction period. The income effect of $50 million resulting from Alternative 2 construction would be beneficial, but not substantial, when compared to the two-county regional total personal income of $29 billion.

No construction activities would be associated with the proposed land exchange. The proposed land exchange (Pah Rah parcel) would, therefore, have no effect on existing earnings and income in Washoe County.

Tax Receipts. The estimated construction cost of Alternative 2 is approximately $763 million, which is somewhat higher than the costs of the Proposed Action. The temporary beneficial impact to Lincoln County and Clark County, in terms of increased sales and use tax disbursements from the construction of Alternative 2 components would be of the same magnitude as for the Proposed Action, but would be slightly higher.

Similar to that described for the Proposed Action and Alternative 1, changing the land ownership of the Pah Rah parcel from private to federal jurisdiction would reduce property taxes to Washoe County for that parcel.

Housing. The impacts on housing from construction of Alternative 2 would be the same as those described for the Proposed Action for the Clark/Lincoln County area and for Washoe County.

Community Infrastructure. The impacts on community infrastructure from construction of Alternative 2 would be similar to those described for the Proposed

Action for the Clark/Lincoln County area and would be the same as described for the Proposed Action for Washoe County. Alternative 2 would not require a pipeline to convey water (as the Proposed Action does), but would still require the development of the water wells in the Tule Desert. Alternative 2 would also require the construction of a transmission line and gas pipeline, which the Proposed Action would not require.

4.16.3.1.2 Operation Impacts. The effects on employment, unemployment, income, and tax receipts associated with Alternative 2 in the Clark/Lincoln County area and in Washoe County would be the same as those described for the Proposed Action because the operation costs for both alternatives are estimated to be the same. In addition, the impacts on population, housing, and community infrastructure in the Clark/Lincoln County area and in Washoe County would be the same as those described for the Proposed Action.

4.16.3.2 Mitigation

Because no impacts are expected with implementation of Alternative 2, no mitigation is proposed.

4.16.3.3 Cumulative Impacts

Alternative 2, when combined with the other planned projects in the two-county region, would contribute to cumulative socioeconomic impacts in the Clark/Lincoln County area, similar to what was described for the Proposed Action. In addition, the contribution to cumulative impacts on the economy and community infrastructure from implementation of Alternative 2 would be similar to that described for the Proposed Action.

Because the proposed land exchange in the Pah Rah area would not result in impacts on Washoe County population, employment, unemployment, earnings and income, tax receipts, housing, and community infrastructure, it would not contribute to cumulative social and economic impacts in Washoe County.

4.16.4 Tax Receipts if No Land Exchange Were to Occur under the Proposed Action, Alternative 1, or Alternative 2

4.16.4.1 Construction Impacts

If no land exchange were to occur as part of the Proposed Action, Alternative 1, or Alternative 2, and the BLM granted ROWs to accommodate project features, Lincoln County would collect sales and use tax on all real property purchased and delivered to the project site. Sales and use taxes in the range of $33 million would be generated and paid to the State of Nevada. Lincoln County would be expected to collect approximately $15 million during the 26-month project construction period, in addition to the county's portion of the revenue generated from the remaining 3.75 percent of the cumulative tax rate. This would be a temporary (26-month) benefit to the County, increasing the County's sales tax receipts (the FY 1999-2000 sales tax were estimated at $1.7 million).

The portion of sales tax collected during the construction of the Proposed Action that would be disbursed back to Clark County would be small relative to existing county receipts.

If no land exchange were to occur as part of the proposed project, the Pah Rah parcel would remain a privately owned parcel and would continue to generate property taxes for Washoe County. In turn, the Toquop parcel (either the southern or northern parcel) would remain in federal (BLM) jurisdiction, and would, therefore, not generate property tax revenue for Lincoln County. The lack of an exchange of one parcel to private ownership would not adversely affect Lincoln County. However, the lack of a land exchange would eliminate the property tax benefit that would accrue to the county with implementation of the Proposed Action. The property tax revenue that Lincoln County currently generates (approximately $2.3 million in 1999-2000) would not be affected.

4.16.4.2 Operation Impacts. Lincoln County would collect sales and use tax on all real property purchased and delivered to the project site. The annual fixed cost operating budget is anticipated to be approximately $13 million, excluding the cost of natural gas. If the entire annual operating budget represented taxable sales, this would represent a substantial increase for Lincoln County, with reported taxable sales of $25.2 million for fiscal year 1999-2000. Of the 6.75 percent combined tax rate, 3 percent is collected and disbursed directly to the collecting county. This would represent an annual payment of approximately $390,000 to Lincoln County, in addition to the county's portion of the revenue generated from the remaining 3.75 percent of the combined tax rate. This increase in sales tax receipts to Lincoln County would be a benefit. The additional sales tax revenue to Clark County would represent a minor benefit to Clark County.

According to Nevada Revised Statutes, if electricity is sold outside of Lincoln County, the project facilities would be centrally assessed in combination with any of the owners of other Nevada holdings associated with the generation and transmission of electricity (NRS 361.320).

As discussed previously, Washoe County would continue to collect property tax revenues for the Pah Rah parcel.

4.16.5 No Action Alternative

Trends and future conditions associated with the social and economic conditions of Clark County and Lincoln County under the No Action Alternative are expected to be generally similar to existing conditions. As urban development occurs, construction employment would be generated, and as new businesses open, additional long-term employment, earnings, income, and taxes would be generated.

If the No Action Alternative were implemented, the Caliente MFP would not be amended; the Toquop/Pah Rah land exchange would not occur; and no power plant would be constructed in Lincoln County. As a result, no short- and long-term employment, personal earnings and income, and tax receipts would be generated. In addition, neither Toquop parcel in Lincoln County would be transferred to private ownership, and, therefore, would not generate property taxes in that county. Taxes that are currently generated in Washoe County from the Pah Rah parcel would continue to be generated.

If the No Action Alternative were implemented and an electricity shortage occurs in the future as a result of the growth that is occurring in Clark County and in the Southwest, commercial and residential electric accounts may be expected to pay higher rates as alternative sources of electricity are obtained. If the prices are too high or if there is an electricity shortage, businesses or industries may close and leave the area, affecting local employment and earnings, income, and tax receipts.

4.17 Transportation

This analysis addresses the potential temporary traffic impacts from project construction activities, and the potential traffic impacts from project operation.

4.17.1 Proposed Action

4.17.1.1 Impacts

Construction of the Proposed Action would result in a temporary (26-month) direct increase in average daily traffic (ADT) on I-15 near the East Mesa Interchange (Exit 109). Normal construction hours are expected to be from 6:00 a.m. to 3:00 p.m. on weekdays. Some activities may require extended construction hours, and nighttime construction may be necessary to meet the overall project schedule.

Average construction workforce is estimated at 500, resulting in an increase of 1,000 average daily vehicle trips in that area if each worker drove alone to and from the project site. Peak workforce is estimated at 950, resulting in an increase of 1,900 average daily vehicle trips in that area if each worker drove by himself to and from the project site. These are increases of 5 percent and 10 percent, respectively, over the future (2003) estimated ADT level of 18,818. In either instance, these are substantial increases in ADT on I-15. A review of hourly traffic volume along I-15 east of the East Mesa Interchange indicates the following travel characteristics for this area:

- Transient traffic entering and leaving Nevada, and not commuter traffic, occurs on this stretch of freeway. Traffic from Utah arrives near the East Mesa Interchange between 9:00 a.m. to 10:00 a.m.; peak traffic in that area is 10:00 a.m. to 11:00 a.m. (Leegard, 2001).

- For all days of the week, traffic levels are lowest at 2:00 a.m. After 2:00 a.m., traffic levels slowly begin to increase until they reach their peak between 2:00 and 4:00 p.m. After 4:00 p.m., traffic levels decrease (Leegard, 2001)

- Daily southbound (west) traffic levels are higher than northbound (east) traffic levels

Construction workers are assumed to travel daily to the project site from either the Las Vegas metropolitan area; Mesquite or Overton, Nevada; or St. George, Utah. If each worker travels to the project site in a personal vehicle, the increase in ADT along I-15 during the project construction period would range from 5 to 10 percent. The workers would travel to the project site between 4:30 a.m. and 6:00 a.m., which is during a relatively low traffic period (peak morning traffic on I-15 in that area is from 10:00 a.m. to 11:00 a.m.).

This would result in a temporary adverse traffic impact on I-15 near the East Mesa Interchange. This is because adding 500 cars to I-15 between 3:00 p.m. and 4:00 p.m. would be an increase of approximately 84 percent in traffic. Adding 950 cars to I-15 between 3:00 p.m. and 4:00 p.m. would be an increase of approximately 159 percent in traffic.

Adding 500 to 950 cars to the East Mesa Interchange off ramp at the start of a shift and at the onramp at the end of a shift to exit and enter I-15 would affect traffic flow at the interchange at these two times of day. Throughout the rest of the day, the interchange onramp and off ramp traffic flow would not be affected.

Parking for construction workers would be provided at the power plant site which has sufficient area to accommodate large numbers of personal vehicles.

If construction workers are required to work at night, the additional traffic would not result in an impact on I-15 traffic. The increased traffic from project construction would be a high percentage of the existing nighttime traffic levels because the existing traffic numbers are so low (ranging from 255 to 1,313 between 6:00 p.m. and 6:00 a.m.).

In addition to construction workforce traffic, traffic would also be generated from equipment deliveries. However, once equipment is delivered to the project area, no effect on traffic would occur until the equipment is removed from the project area. These infrequent deliveries would not result in an impact on I-15 traffic. Deliveries of materials and concrete would also generate traffic, and would average 10 deliveries per day over the 26-month construction period. This would result in approximately 20 daily vehicle trips (10 trips accessing the project area and 10 trips leaving the project area). This increase in traffic would not adversely impact I-15 traffic. At the East Mesa Interchange, these 20 daily trips would result in a 6 percent increase in offramp traffic when traveling east/northbound on I-15, and a 4 percent increase in offramp traffic when traveling west/southbound.

A review of the capacity of the one-lane concrete underpass that crosses under I-15 at the East Mesa Interchange indicates that no improvements would be required to accommodate construction workforce and delivery traffic. Construction worker transport vehicles are all expected to be inbound to the project site at the start of a work shift, and would all be outbound from the project site at the end of a shift. Vehicles coming from opposing sides of the underpass would be required to give the right-of-way to the vehicle that arrived first at the underpass, in accordance with current traffic laws. Vehicles that are too large to pass through the underpass at the East Mesa Interchange would access the site by exiting and then later returning to I-15 via the Riverside-Bunkerville Interchange (Exit 112) and/or the Carp-Elgin Interchange (Exit 100), depending whether the vehicles are traveling eastbound or westbound.

Because I-15 was constructed to handle interstate traffic, it has been designed to handle the loads of semi-trucks and trailers. Therefore, construction of the Proposed Action would not affect existing roadway condition. Prior to project construction, the access road to the southern Toquop parcel would need to be improved to accommodate materials delivery vehicles, equipment, and construction worker transport vehicles. Portions of the road would need to be widened to two lanes and straightened where necessary, and the entire length of the access road from I-15 to the south Toquop parcel would need to be paved.

Operation of the Proposed Action would be 24 hours per day, 365 days per year. The plant would be operated by 15 employees from 7:00 a.m. to 3:00 p.m.; 5 employees from 3:00 p.m. to 11:00 p.m.; and 5 employees from 11:00 p.m. to 7:00 a.m. These 25 employees would require an additional 50 vehicle trips per day: 20 trips at 7:00 a.m., 20 trips at

3:00 p.m., and 10 trips at 11:00 p.m. This amount of operation-induced traffic would not affect I-15 or East Mesa Interchange offramp traffic patterns.

The Proposed Action would result in increased traffic on the unpaved road to the Southern Toquop Parcel and the wellfield. Several trucks and semi-trailers that currently drive to the well site have created powdered roads and have rutted the roads when they are wet. Regulated speeds of project vehicles would reduce the potential for further road impacts.

Transportation-related measures to manage traffic during project operation are included in the Proposed Action and are described in *Appendix B, Standard Construction and Operation Procedures.* Measures include: vehicles coming from opposing sides of the underpass at the East Mesa Interchange during project construction would be required to give the right-of-way to the vehicle that arrived first at the underpass; and scheduling project vehicles during peak construction periods so that they arrive at the one-lane underpass at intervals considered suitable to provide smooth traffic flow patterns.

Because no development would occur at the Pah Rah parcel, no changes in existing traffic levels on I-80 and SR-447 are expected.

4.17.1.2 Mitigation

The construction contractors will be encouraged to use staggered work shifts to minimize transportation conflicts.

4.17.1.3 Cumulative Impacts

As growth occurs in the southern Nevada region, additional vehicle trips will be generated along major freeways and local roadways. This project was assessed in light of other interrelated projects identified in *Section 1.8, Interrelated Projects.*

The Kern River 2003 Expansion Project, which would cross the Toquop parcel and is expected to be constructed in November 2002 through January 2003 in the project area, would be the closest to the Toquop Project, both geographically and in time. The EIS/EIR for the Kern Project identified traffic congestion and roadside parking hazards as potential impacts during that project's construction. The transportation impacts were mitigated by measures that included requiring construction workers to be transported to the project site via buses provided by the contractor. The EIS/EIR indicated that the mitigation would reduce the impacts to less-than-significant levels.

The potential exists for a cumulative temporary impact on traffic flow at the East Mesa Interchange offramp during the projects' construction periods if the Kern Project and the Proposed Action were constructed concurrently. However, construction of the Proposed Action is anticipated to begin in January or February 2003, so very little, if any, overlap between these two projects would occur. Also, the mitigation required as part of both projects would reduce the potential cumulative impact.

As discussed above, the increased traffic from construction of the Proposed Action would be temporary and the increased traffic from project operation would be very minor. Therefore, implementation of the Proposed Action would not contribute to cumulative impacts on traffic on I-15.

4.17.2 Alternative 1

4.17.2.1 Impacts

Traffic impacts associated with Alternative 1 for both construction and operation would be similar to those described for the Proposed Action.

4.17.2.2 Mitigation

Mitigation described for the Proposed Action in the Toquop area also would be applicable to Alternative 1. No mitigation is proposed in the Pah Rah area because no impacts would occur.

4.17.2.3 Cumulative Impacts

Cumulative traffic impacts associated with Alternative 1 would be similar to those described for the Proposed Action.

4.17.3 Alternative 2

4.17.3.1 Impacts

Traffic impacts associated with Alternative 2 for both construction and operation would be similar to those described for the Proposed Action, plus the access road would be extended to the northern Toquop parcel under Alternative 2.

4.17.3.2 Mitigation

Mitigation described for the Proposed Action in the Toquop area also would be applicable to Alternative 2. No mitigation is proposed in the Pah Rah area because no impacts would occur.

4.17.3.3 Cumulative Impacts

Cumulative traffic impacts associated with Alternative 2 would be similar to those described for the Proposed Action.

4.17.4 No Action Alternative

Trends and future conditions associated with traffic in the Toquop and Pah Rah areas under the No Action Alternative would be generally similar to existing conditions. Therefore, no impact on existing traffic levels is expected with implementation of this alternative. Development may occur in the future in these areas, but the level and type of development that would occur and the associated traffic conditions is unknown.

4.18 Unavoidable Adverse Impacts

Unavoidable adverse impacts are residual impacts after implementation of mitigation measures. Those unavoidable adverse impacts associated with the Toquop Energy Project and the Pah Rah/Toquop land exchange that would remain after mitigation are summarized in the following text.

4.18.1 Soils and Geology

Some biological soil crusts at the southern and possibly the northern power plant sites, along the western and eastern water pipeline corridors, and along the utility corridor. Some may be lost because of project construction.

4.18.2 Surface Water Hydrology

No unavoidable adverse impacts on surface water hydrology or quality would occur.

4.18.3 Ground Water Resources

The only unavoidable adverse impact would include localized temporary ground water level declines and ground water consumption in the Tule Desert.

4.18.4 Biological Resources

Project construction would disturb desert tortoise habitat, habitat for other wildlife, and vegetative cover. Disturbed habitat would total 449 acres under the Proposed Action, 451 acres under Alternative 1, and 581 acres under Alternative 2. On average, these acreages are estimated to provide habitat for 8 desert tortoises under the Proposed Action and Alternative 1 and 10 desert tortoises under Alternative 2. Following reclamation, net new long-term disturbances would total 182 acres under the Proposed Action and Alternative 1 and 237 acres under Alternative 2. On average, these acreages are estimated to provide habitat for three and four desert tortoises, respectively. Some residual unavoidable adverse effects on wildlife would potentially occur—including mortalities of unprotected reptile and small mammal species and habitat destruction during construction activities. No unavoidable adverse impacts on wetlands/riparian zones, floodplains, ephemeral washes, fisheries resources, or wild horses and burros would occur.

4.18.5 Air Quality and Noise

No unavoidable adverse impacts on air quality and noise would occur.

4.18.6 Visual Resources

Unavoidable adverse impacts would include the presence of construction vehicles, equipment, personnel, and activities, and associated fugitive dust emissions during construction. Constructed project features would comply with the BLM's designated VRM Class IV of the Toquop area.

4.18.7 Recreation Resources

No unavoidable adverse impacts on recreation resources would occur.

4.18.8 Land Use, Prime or Unique Farmlands, and Rangelands

Under Alternative 2, the northern Toquop parcel would remove 640 acres of rangeland from the Garden Springs Allotment that is currently being managed for livestock use. This could result in a reduction of permitted grazing use of 46 AUMs.

4.18.9 Wilderness Study Areas, Areas of Critical Environmental Concern, and Wild and Scenic Rivers

A construction disturbance of 236 acres of habitat within the Mormon Mesa ACEC (a desert tortoise Special Management Area) from staging, widening, straightening, and paving the 14.4-mile-long access road from I-15 to the southern Toquop parcel would occur. Following reclamation, the net new long-term disturbance would be 65 acres.

4.18.10 Wastes, Hazardous and Solid

No unavoidable adverse impacts from hazardous or solid wastes would occur.

4.18.11 Cultural and Historical Resources and Native American Religious Concerns

No known direct unavoidable adverse impacts on cultural or historical resources would occur. Potential indirect unavoidable adverse impacts on these resources could result from increased human activity in the area and possibly increased OHV use. BLM has requested but not received sufficient information from all Indian Tribes to establish whether issues exist for Native Americans.

4.18.12 Indian Trust Assets

No unavoidable adverse impacts on Indian Trust assets would occur.

4.18.13 Environmental Justice

No unavoidable adverse impacts on minority or low-income populations would occur.

4.18.14 Paleontological Resources

No unavoidable adverse impacts on paleontological resources would occur.

4.18.15 Socioeconomics

No unavoidable adverse impacts on economic variables or community infrastructure in the Clark/Lincoln County area would result from project construction or operation.

4.18.16 Transportation

Unavoidable adverse impacts on transportation would include traffic increases on I-15 and at the East Mesa Interchange during project construction.

4.19 Relationship Between Local Short-Term Uses of the Environment and the Maintenance and Enhancement of Long-Term Productivity

4.19.1 Introduction

For purposes of this discussion, "short-term" is defined as the approximate 2-year period during project construction and shortly thereafter during initial project operation. "Long-term" is defined as the entire operational life of the Proposed Action, Alternative 1, or Alternative 2, which is estimated to be approximately 40 years. After this time the Toquop Energy Project would be decommissioned. Implementation of the Proposed Action, Alternative 1, or Alternative 2 would necessitate uses of the environment whose effects would be apparent during project construction and operation, and which would result in both beneficial and adverse effects on long-term productivity.

Potential impacts associated with implementation of the Proposed Action, Alternative 1, or Alternative 2 are discussed in *Sections 4.1* through *4.17* of this document. These same sections also discuss cumulative impacts associated with the Proposed Action, Alternative 1, or Alternative 2, when combined with proposed and/or anticipated projects. Unavoidable adverse impacts resulting from project construction and operation that would remain after implementation of mitigation measures are described in *Section 4.18* of this document. Many of the potential impacts described in *Sections 4.1* through *4.17* are either temporary in nature, not substantial in magnitude, or they would be mitigated to prevent the occurrence of unavoidable adverse effects. These use-related effects are briefly summarized in the following text, as are the effects on long-term productivity.

4.19.2 Short-Term Uses

Most impacts on environmental resources would initially result from construction activities and be temporary in duration, but others would persist for the operational life of the project. The range of these effects includes:

- Use of local soils, disturbance and some loss of biological soil crusts, and commitment of habitat during project construction and operation
- Increased erosion potential until disturbed areas are reclaimed
- Use of ground water during project construction and operation
- Disturbance and/or loss of habitat and/or vegetative cover used by desert tortoises, other species of wildlife, wild horses, recreationists, and livestock

Lands that would be disturbed and/or included in construction rights-of-way total approximately 449 acres under the Proposed Action, 451 acres under Alternative 1, and 581 acres under Alternative 2. All of these lands are classified as desert tortoise habitat and, on average, would provide habitat for approximately 8 desert tortoises under the Proposed Action and Alternative 1 and 10 desert tortoises under Alternative 2. Following reclamation, net new long-term disturbances would total 182 acres under the Proposed Action and Alternative 1 (habitat for 3 desert tortoises) and 237 acres under Alternative 2 (habitat for 4 desert tortoises). A net construction disturbance of 236 acres would result from access road improvement within the Mormon Mesa ACEC, which is a desert tortoise Special Management Area. Following reclamation, the net new long-term disturbance would be 65 acres.

Additional effects would result from short-term uses of the environment. Effects on air quality would primarily be short-term and localized, resulting from construction activities that create fugitive dust and vehicle and equipment engine emissions. Project construction and operation activities would impact the area's visual resources and ambient noise levels, but not substantially and not at levels that would affect recreationists' use and enjoyment of the project area or adjacent lands. Any cultural resources encountered during construction activities could be degraded or destroyed, unless they are fully mitigated as described in this document. Local and regional economies would benefit from the construction and operation of the proposed Toquop Energy Project, especially in Lincoln County because of increases in tax receipts resulting from the proposed project. No long-term adverse effects would result from transportation-related activities. There would be no effects on geologic features, paleontological resources, Indian trust assets, environmental justice, or hazardous and solid wastes.

4.19.3 Maintenance and Enhancement of Long-Term Productivity

Long-term productivity related to the Proposed Action, Alternative 1, or

Alternative 2 includes long-term increases in the regional supply of reliable, electrical power at competitive costs for use by consumers to help meet shortages in the western United States. On a more local level, this includes an increased availability of electrical power for the State of Nevada and the Las Vegas area. The Proposed Action, Alternative 1, or Alternative 2 would help meet short-term and long-term power requirements of existing regional population areas, both for residential and commercial/industrial uses. The direct and indirect economic benefits of project construction and operation and of increased power production would support or contribute directly to the long-term economic growth, both locally and regionally, and particularly in Lincoln County.

Long-term productivity also would be enhanced through the Pah Rah/Toquop land exchange. The Proposed Action, Alternative 1, or Alternative 2 would provide the BLM a mechanism for acquiring a desirable parcel of private land in the Pah Rah Range in northwestern Nevada. The proposed land exchange would facilitate public land management by the BLM by creating contiguous tracts of land adjoining the Pah Rah parcel. Conversion to private ownership of a similarly valued section of public land in Lincoln County on which the power plant would be located, and the construction of associated project facilities including the wellfield and linear infrastructure, would result in increased long-term power production. This land exchange would require short-term uses of the environment and affect the long-term productivity of several resources as summarized in *Section 4.19.2*.

4.20 Irreversible and Irretrievable Commitments of Resources

Resources committed to the Proposed Action, Alternative 1, or Alternative 2 would be environmental, material, and financial. An irreversible commitment of resources occurs if the commitment cannot be changed once made. An irretrievable commitment of resources occurs when resources are used, consumed, destroyed, or degraded during project construction, operation, and maintenance and cannot be reused or recovered for the life of the project or beyond. Construction of the Proposed Action, Alternative 1, or Alternative 2 would result in several irreversible and irretrievable commitments of resources, including labor, capital, some construction materials, fuels, and ground water. Construction materials such as sand, gravel, cement, chemicals, fuels, and other petroleum products would be consumed. Materials such as steel, aluminum, and wood could be recycled and, therefore, would not be irretrievable. Table 4-18 summarizes irreversible and irretrievable commitments of resources for the Proposed Action, Alternative 1, or Alternative 2. Determinations of whether or not there would be irreversible and irretrievable commitments of environmental resources were based on discussions of direct and indirect project effects in *Sections 4.1* through *4.17* of this document. As summarized in Section *4.18*, very few of those effects would result in adverse impacts on environmental resources.

TABLE 4-18
Irreversible and Irretrievable Commitments of Resources

Resource	Irreversible Impacts?	Irretrievable Impacts?*	Nature of Impact
Soils	Yes	Yes	See *construction materials and fuels* below
Geology	No	No	
Surface water	No	No	
Ground water	Yes	Yes	Used in construction, plant processes, and cooling operations
Threatened, endangered, and sensitive species	No	Project Lifespan	Some harassment and/or loss of special status species and habitat
Vegetation and noxious weeds	No	Project Lifespan	Disturbance and/or loss of vegetation and habitat
Wild horses and burros	No	No	
Wildlife and fisheries	No	Project Lifespan	Some harassment and/or loss of wildlife species and habitat
Wetlands/riparian zones, floodplains, and waters of the United States	No	No	
Air quality	No	Project Lifespan	Some minor degradation of air quality during construction and operation
Noise	No	Project Lifespan	Noise exceeds ambient levels during construction and operation at a relatively minor level
Visual resources	No	Project Lifespan	Relatively minor viewshed intrusion
Recreation resources	No	Project Lifespan	Construction and operation areas unavailable for recreation to an insignificant degree
Land use	No	Project Lifespan	Loss of rangeland at the northern Toquop parcel would be compensated for financially
Wilderness Study Areas and Areas of Critical Environmental Concern	No	Project Lifespan	Improved access road would pass through an ACEC
Hazardous and solid wastes	No	No	
Cultural resources	Yes	Yes	Potential disturbance if sites are inadvertently discovered during construction; destruction of known archaeological resources—none of which are eligible for the NRHP nor have they been identified to BLM by Native Americans as properties of traditional cultural or religious importance.
Indian Trust Assets	No	No	
Environmental justice	No	No	
Paleontological resources	No	No	

TABLE 4-18
Irreversible and Irretrievable Commitments of Resources

Resource	Irreversible Impacts?	Irretrievable Impacts?*	Nature of Impact
Socioeconomics	No	Project Lifespan	Increased regional and local employment and revenues during construction and operation
Transportation	No	No	
Construction materials and fuels			
Sands and gravels	Yes	Yes	
Ground water	Yes	Yes	
Steel	Yes	Project Lifespan	
Aluminum	Yes	Project Lifespan	
Concrete	Yes	Yes	
Chemicals	Yes	Yes	
Wood	Yes	Project Lifespan	
Natural gas	Yes	Yes	

*"Project lifespan" indicates an irretrievable impact would extend through project construction and operation. "Yes" indicates impact duration would be forever.

4.21 Energy Requirements and Conservation Potential

Energy requirements under the Proposed Action, Alternative 1, and Alternative 2 for project construction, operation, and maintenance activities would include the use of the following:

- Petroleum products (diesel, gasoline, oil, and grease)
- Electricity from the Navajo-McCullough Electrical Transmission Line until the Toquop Energy power plant becomes operational
- Various building, operations, and maintenance materials such as aggregate from borrow areas, water from the Tule Desert wellfield, steel, aluminum, concrete, and wood

Other energy requirements would include the use of natural gas from the Kern River Gas Pipeline for fueling the power plant's combustion turbine generators, and the use of various chemicals for treating power plant condensate and circulating water. These basic energy requirements cannot be determined specifically for each alternative because of the variability of potential actions. However, on a comparative basis, the Proposed Action and Alternative 1 would be expected to have the lowest and similar energy requirements. Alternative 2 would potentially have the greatest energy requirements because of the construction of the electric transmission and natural gas lines and the extension of the access road into the northern power plant site. For these reasons, the conservation potential would be greater under the Proposed Action and Alternative 1 than under

Alternative 2. The No Action Alternative would have no project-related energy requirements.

4.22 Monitoring

The monitoring programs described below are included as part of this project.

4.22.1 Caliente MFP Amendment

Monitoring and evaluation would be conducted at 5-year intervals for the Caliente MFP. These data would be used to determine the effectiveness of the plan amendment in achieving the desired results; to ensure that Best Management Practices (BMPs), Standard Operating Procedures (SOPs) and mitigation measures are satisfactory; and to ascertain whether changes have occurred in related plans of other federal, state, or local governments. Any information gained would be incorporated into future planning, including other amendments or revisions to the Caliente MFP.

4.22.2 Ground Water

A ground water monitoring plan will be developed as part of the wellfield design. This plan will assess changes in water levels downgradient from the production wells. Its purpose is to determine the extent of any ground water cones of depression that could result from operation of the production wells. In addition, the only existing well in the Tule Desert will be monitored to assess any changes in ground water levels or other effects on its ability to satisfy its water rights.

4.22.3 Evaporation Pond

A monitoring plan will be developed for leak detection at the evaporation pond in accordance with the requirements and guideline established by the Nevada Division of Environmental Protection, Bureau of Water Pollution Control.

4.22.4 Air Quality

Continuous Emission Monitoring Systems (CEMS) will be installed for each combustion turbine/duct burner stack to measure NOx and O_2 concentrations and fuel flow rate and to record the concentration and mass flow rate of NOx. Parametric monitoring, to verify that the turbines are operating in a range where good combustion practice would be assured, or else CEMS will be used to monitor emissions of CO and other pollutants. Periodic sampling of fuel, in accordance with a custom fuel monitoring schedule as approved by NDEP, will be used to monitor SO_2 emissions from the combustion turbines and duct burners.

In addition initial compliance testing, performed by collection and analysis of actual stack gas samples for the purpose of verification full load emission rates versus permitted levels, will be required for NOx, SO_2, CO, PM10, and VOCs. For NOx, this data will also be used to verify accuracy of the CEMS, and testing at multiple turbine load conditions will be required for NOx.

4.22.5 Reclamation

A plan will be developed to monitor the success of reclamation and revegetation required by desert tortoise habitat and general reclamation commitments made in Appendixes A and B.

4.22.6 Stormwater

Monitoring and maintenance of the stormwater elements at the Toquop Power Plant site will be conducted to ensure long-term effectiveness of the management system.

4.22.7 Cultural Resources

Monitoring of potential impacts to cultural resources during construction will be conducted in accordance with the Programmatic Agreement (Appendix C).

Chapter 5
Consultation and Coordination

Chapter 5.0 Consultation and Coordination

5.1 Introduction

Scoping is the process of learning the concerns of individuals, organizations, and agencies regarding a proposed project. Scoping is an integral part of the NEPA review process because it allows interested parties to participate in developing a list of issues that will be discussed in an EIS. Through the consultation and coordination process, interested parties can review and comment on the substantive issues presented in the DEIS and other study documents. This section discusses the public scoping process and agency coordination followed in preparation of the DEIS.

5.2 Public Scoping

Public scoping for the MFP Amendment/ Toquop Energy Project EIS was comprised of three separate scoping efforts:

- Scoping for the Pah Rah/Toquop Land Exchange—Conducted by the BLM during July 2001
- Scoping for the Toquop Energy Project—Conducted by the BLM during July and August 2001
- Scoping for the combined Toquop Energy Project and Pah Rah/Toquop Land Exchange EIS, requiring an amendment to the Caliente Management Framework Plan—Conducted by BLM during November and December 2001

5.2.1 Public Scoping for the Pah Rah/Toquop Land Exchange

Public scoping meetings were held on July 10, 2001, in Mesquite, and July 11, 2001, in Reno. The meetings were conducted using an open-house format. BLM representatives posted maps showing the exchange parcels, provided photographs of the sites, and discussed concerns with individuals. The Mesquite meeting was attended by 14 individuals and the Reno meeting was attended by 11 individuals. The meetings were advertised through notices in the Mesquite, Lincoln County, and Reno newspapers and individual mailings.

Concerns voiced at the meetings were summarized in a memorandum dated July 20, 2001. Written comments were also submitted to the BLM after the meetings. Most of the commentors were not in favor of the land exchange, and those that did not state a position had questions about particular impacts. The number of comments provided in each resource category were as follows (from highest number of comments to lowest):

- Wildlife habitat, or general habitat concerns: 6 comments
- Cultural and historical resources: 4 comments
- Economic value of land: 3 comments
- Water development: 2 comments
- Visual resources: 1 comment
- Recreation: 1 comment

- Other concerns: 4 comments
  - Combine land exchange and power plant NEPA process: 2 comments
  - Mapping is inaccurate: 1 comment
  - Land exchange is not valid under regulations: 1 comment

5.2.2 Public Scoping for the Toquop Energy Project

Public involvement for the Toquop Energy Project was initiated with public information meetings held in Caliente, Nevada, on July 11, 2001, and Mesquite, Nevada, on July 12, 2001. These meetings were advertised in the local newspapers in Lincoln County, Mesquite, and Las Vegas, as well as in individual mailings.

The Notice of Intent (NOI) to prepare the EIS on the Toquop Energy Project was published in the *Federal Register* on July 22, 2001. Notice of a public meeting was advertised in the NOI; in local newspapers in Lincoln County, Mesquite, and Las Vegas; and in individual mailings. A public scoping meeting was held in Las Vegas on August 15, 2001.

An open-house format was used at each meeting where project and BLM representatives presented project information on display boards and handouts, and discussed concerns with individuals. The Caliente meeting was attended by 14 people, 39 people attended the Mesquite meeting, and 25 attended the Las Vegas meeting.

Concerns voiced at the meetings were written on flip charts. Written comments were also submitted to the BLM during and after the meetings. Comments fell into three broad categories, each of which is described below:

- Those in favor of the project
- Those who are concerned about the potential impacts of the project
- Those who did not state a position, but if the project happens, want local union labor to be employed

5.2.2.1 Favor the Project

Three of the commentors favored the project, indicating that the site would not have serious environmental consequences.

5.2.2.2 Concerned About the Potential Impacts of the Project

Many commentors were concerned about potential impacts or suggested questions that should be answered in the DEIS. The number of comments provided in each resource category were as follows (from highest number of comments to lowest):

- Water development, use, and ground water impacts: 16 comments
- Habitat, wildlife, ACEC, and WSA concerns: 15 comments
- Air quality: 4 comments
- Economic value of land for exchange: 1 comment
- Noise : 1 comment
- Soils: 1 comment
- Economics (tax contribution not enough to cover ecological costs): 1 comment
- Other concerns: 6 comments, as listed below.
  - Combine land exchange and power plant NEPA process: 1 comment

- Mesquite and Clark County would get pollution but no economic boost: 1 comment
- Lack of comprehensive plan for the power plant: 1 comment
- No Arizona or Mohave County officials informed of project: 1 comment
- Evaluate cumulative effects of all proposed power plants: 1 comment
- Provide complete index of all generation due to come on line and the expected rolling blackouts to determine project need: 1 comment

5.2.2.3 Local Union Labor for Project

Many of those who attended the public meetings were concerned that if an out-of-state company were selected to construct the Toquop Energy facility, the chosen firm would bring in out-of-state workers to build the plant. Ten people submitted written comments that local union labor should be used. Although it is not within the scope of the DEIS to dictate what labor force would be used to build the plant, the evaluation of socioeconomic resources in the DEIS will address this topic.

5.2.3 Public Scoping for the Toquop Land Disposal Amendment to the Caliente MFP/Toquop Energy Project

In reviewing the comments received during the two scoping processes described above, the BLM determined that calls to combine the two NEPA processes had merit. It was also determined that the Pah Rah/Toquop Land Exchange required an amendment to the Caliente Management Framework Plan. Consequently, the decision was made to combine these actions into a single EIS and to reopen the scoping process for the expanded project.

The NOI to prepare an EIS for the Toquop Land Disposal Amendment to the Caliente MFP/Toquop Energy Project was published in the *Federal Register* on November 7, 2001. The Notice was also published in local newspapers in Lincoln County, Mesquite, and Las Vegas. The public comment period closed on December 7, 2001. The scoping process for both the Pah Rah/Toquop Land Exchange EA and the Toquop Energy Project EIS included public scoping meetings. The BLM determined that further public scoping meetings were duplicative and unnecessary for the expanded EIS.

Fifteen comment letters were received. The following issues were identified:

- Consider an air-cooled plant as an alternative (3 comments)
- Concern over impacts of ground water withdrawal on surface water and fish and wildlife (9 comments)
- Concern over air quality impacts (4 comments)
- Concern over compliance with NEPA, Land Exchange Rules, and state statutes (7 comments)
- Impacts to cultural resources (2 comment)
- Impacts to natural resources from facilities (2 comments)
- Concern over comparable values of the parcels involved in the land exchange (4 comments)

5.3 Coordination During MFP Amendment/Toquop Energy Project DEIS Development

5.3.1 General Consultation

The agencies listed below were consulted during the preparation of this DEIS. Specific references citing individuals, as appropriate, are provided in the text of this document. Agencies and Indian Tribes consulted include the following:

- Federal
    - Bureau of Land Management, Ely Field Office, Nevada
    - Bureau of Land Management, Carson City Field Office, Nevada
    - Natural Resources Conservation Service
    - Fish and Wildlife Service (FWS), Las Vegas Office, Nevada
    - National Park Service (NPS), Denver, Colorado
    - Bureau of Indian Affairs
- State
    - Nevada Division of Wildlife (NDOW), Reno, Nevada
    - Nevada Department of Transportation
    - Nevada Public Utility Commission (NPUC)
    - Nevada State Historic Preservation Office
    - Nevada Division of Environmental Protection (NDEP), Reno, Nevada—Water Pollution Control Bureau
    - Nevada Division of Environmental Protection—Air Quality Bureau
    - Arizona Department of Environmental Quality—Division of Air Quality
    - Utah Department of Environmental Quality—Division of Air Quality
    - Nevada Division of Water Resources
- County
    - Lincoln County Planning Department
    - Clark County Department of Air Quality Management
    - Lincoln County Sheriff's Department
    - Lincoln County Fire Department
    - Washoe County Department of Community Development
    - Clark County Department of Comprehensive Planning
- Indian Tribes
    - Moapa Band of Paiutes
    - Paiute Indian Tribe of Utah
    - Shivwits Band (Utah)
    - Las Vegas Paiute Tribe
    - Kaibab Paiute Tribe (Arizona)

5.3.2 Native American Consultation

Native American consultation occurred initially in relation to a land exchange proposal, now an alternative component of the Toquop Energy Project. Consultation with American Indian tribes also was initiated specifically in regard to the Toquop Energy Project itself.

5.3.2.1 Pah Rah-Toquop Wash Land Exchange

The Bureau of Land Management (BLM), Carson City Field Office, initiated consultation with Native Americans regarding the proposed Pah Rah-Toquop Wash land exchange on October 25, 2000. Letters went to Chairpersons of the Moapa Band of Paiutes, the Paiute Indian Tribe of Utah, and the Shivwits Band (Utah), all representatives of the ethnographic

Southern Paiute who inhabited the Toquop Wash area at the time of historic contact. The letter described the specific location of the federal exchange parcel in Lincoln County (T11S, R69E, Section 36) and gave a general location for the offered private land in Washoe County. Each tribe was asked for comments regarding cultural values, issues or concerns, and to identify any other persons or groups who should be informed of the proposed land exchange. Subsequently, telephone calls were made to Chairpersons to initiate data collection about Native American concerns. At the request of the tribes, two other groups (Las Vegas Paiute Tribe, Kaibab Paiute Tribe) and one individual (Richard Arnold, Pahrump, Nevada) were informed of the project and asked for statements of any concern. Efforts also have been made to help ensure that newly elected tribal Chairpersons were informed of the project as BLM learned of their elective status.

Tribes expressing interest in consultation included the Moapa Band of Paiutes, the Paiute Indian Tribe of Utah, and the Shivwits Band, while the Las Vegas Paiute Tribe responded that they did not desire involvement in the consultation process; no responses were received from the other tribe or individual. The Paiute Indian Tribe of Utah responded in a letter of December 11, 2000, expressing concerns about possible project-related effects on the Salt Song Trail. The Paiute Indian Tribe of Utah also requested a better map and requested an ethnographic study. The Chair and another member of the Moapa Band of Paiutes made a field examination of the Toquop Wash federal exchange parcel in January 2001. Representatives of the Paiute Indian Tribe of Utah and the Shivwits Band, and again the Chair of the Moapa Band of Paiutes, also made a field visit that same month. Examples of known archaeological resources were visited, and the Salt Song Trail was discussed generally. The BLM maintained telephone contact in ensuing weeks and months in an effort to establish whether the tribes' concerns for possible effects on the Salt Song Trail were any different after the field inspection. However, no response was received.

In June 2001, the BLM sent a letter and consultation summary to the Moapa Band of Paiutes, the Paiute Indian Tribe of Utah, the Shivwits Band, the Las Vegas Paiute Tribe, the Kaibab Paiute Tribe, and Richard Arnold. The BLM letter conveyed results of the cultural resources inventory, as well as the BLM's conclusion that no tribe had identified the Salt Song Trail or related sites as being within the Toquop Wash land exchange parcel, and that no tribe had identified any possible effects to the Salt Song Trail if the proposed exchange were implemented.

In July 2001, the newly elected Chairperson of the Moapa Band of Paiutes expressed concerns in a public scoping meeting held in regard to the proposed land exchange. A specific concern was expressed for the Salt Song Trail, which was identified by the chairman as a sacred site. A general location was given to the BLM representative. The Salt Song Trail was described as a trail along which ancestral spirits move as songs are sung by contemporary members of the Moapa Band of Paiutes (and perhaps other persons as well). No information was received as to how or whether the contemporary practitioners physically utilize the proposed project area in conducting their sacred rituals. The chairman asserted that the spirits' movements might be hindered or precluded by projects such as the proposed land exchange and developments that would occur there. In July 2001, the BLM sent letters to the Moapa Band of Paiutes, the Paiute Indian Tribe of Utah, and the Shivwits Band restating the BLM's need for a more specific location of the Salt Song Trail with relation to the proposed Toquop Wash land exchange parcel. The BLM also indicated the need for information as to how the proposed land exchange action would affect the significance, use, or integrity of the Salt Song Trail. No responses have been received to date.

Northern Nevada tribes were asked for any expressions of concern for the offered private land in Washoe County, in the Pah Rah Range. BLM opened formal communication with the Washoe Tribe of Nevada and California, the Pyramid Lake Paiute Tribe, and the Reno-Sparks Indian Colony in January 2001. The first made an onsite field visit by a tribal elder and the Washoe Tribe's cultural resources coordinator, while the tribal chairmen of the other two made visual inspections. No concerns were expressed about potential effects of the proposed land exchange.

5.3.2.2 Toquop Energy Project

The BLM, Ely Field Office, initiated consultation regarding the proposed Toquop Energy Project in December 2001 with Chairpersons of five tribes, including the Moapa Band of Paiutes, the Paiute Indian Tribe of Utah, the Shivwits Band (Utah), the Las Vegas Paiute Tribe, and Kaibab Paiute Tribe. The tribes were asked if they had any cultural values, issues, or concerns that might be affected by the proposed action. The BLM, Ely Field Office, had also initiated contact in November 2001 in a monthly tribal coordination meeting attended by the Ely Shoshone Tribe. No concerns were expressed in that meeting. The letters were followed by telephone calls to continue data collection.

Most initial calls were made in December 2001 to tribal Chairs, while one (to the Moapa Band of Paiutes) was made in January 2002 after the outcome of a tribal Chair election late in December 2001. Telephone contact was made with the Chairpersons of the Paiute Indian Tribe of Utah, the Moapa Band of Paiutes and the Shivwits Band. Telephone contact was also made with the Tribal Attorney for the Las Vegas Paiute Tribe and with a cultural resources specialist in the Natural Resources Division of the Kaibab Paiute Tribe. In two cases, the tribes contacted by telephone requested copies of the original certified letters which were resent by facsimile transmission. In one case, the original certified letter had been undeliverable so the facsimile copy was sent.

The Paiute Tribe of Utah initially expressed interest in continued consultation but ultimately indicated it had no concerns about the project. The Shivwits Band indicated that: 1) it was concerned about the preservation of archaeological sites; and 2) that, based on information from its members who made the on-site inspection in January 2001, the Salt Song Trail did not extend as far as the project area. The Las Vegas Paiute Tribe had no concerns about the project. No additional information has been received from either the Moapa Band of Paiutes or the Kaibab Paiute Tribe. The BLM will continue its consultation efforts as long as possible prior to making a decision.

5.4 Request for Comments on the Draft Caliente MFP Amendment/Toquop Energy Project DEIS

5.4.1 Distribution

This document has been sent to, and comments requested from the members of the public and other individuals who attended public meetings. It was also sent to the entities listed below.

Federal Government

Arizona Strip Field Office, BLM
Battle Mountain Field Office, BLM
Bureau of Indian Affairs
Caliente Field Station, BLM
Carson City Field Office, BLM
Cedar City Field Office, BLM
Dixie Field Office, BLM
Ely Field Office, BLM
Las Vegas Field Office, BLM
National Park Service
Natural Resources Conservation Service
Nevada State Office, BLM
St. George Field Office, BLM
U.S. Air Force
U.S. Army Corps of Engineers
U.S. Bureau of Mines
U.S. Bureau of Reclamation
U.S. Department of Energy
U.S. Department of Interior
U.S. Environmental Protection Agency
U.S. Fish and Wildlife Service
U.S. Forest Service
U.S. Geological Survey
U.S. National Park Service

State Government

Nevada Commission for the Preservation of Wild Horses
Nevada Division of Agriculture
Nevada Division of Conservation District
Nevada Division of Environmental Protection
Nevada Division of Minerals
Nevada Division of State Lands
Nevada Division of State Parks
Nevada Division of Water Resources
Nevada Division of Wildlife
Nevada Grazing Advisory Board
Nevada Indian Commission
Nevada Legislative Committee on Public Lands
Nevada Natural Heritage Program
Nevada State Clearinghouse
Nevada State Historic Preservation Office
Nevada Wildlife Commission

Local Governments

Alamo Town Board
City of Caliente
City of Mesquite
City of Reno
City of Sparks
Clark County Commission
Enterprise City Advisory Council
Lincoln County Commission
Lincoln County Conservation District
Lincoln County Game Board
Lincoln County Public Lands Commission
Pioche Town Advisory Board
Truckee Meadows Regional Planning Commission
Washoe County Commission

Tribal Governments

Kaibab Paiute Tribe (Arizona)
Las Vegas Paiute Tribe
Moapa Band of Paiutes
Paiute Indian Tribe of Utah
Pyramid Lake Paiute Tribe
Reno-Sparks Indian Colony
Shivwits Band (Utah)
Washoe Tribe of Nevada and California
Yerington Paiute Tribe

Other Organizations

American Land Conservancy
Animal Protection Institute
Audubon Society
Best in the Desert
Center for Biological Diversity
Coalition for Nevada's Wildlife
Desert Research Institute
Fraternity of Desert Bighorn
Friends of Nevada Wilderness
Groundshaker Motorcycle Club
Lincoln County Power
Mineral Policy Center
Mojave-Southern Great Basin Resource Advisory Council
Motorcycle Racers Association of Southern Nevada
Mule Deer Foundation
Native American Heritage Commission
Natural Resources Defense Council
Nature Conservancy
Nevada Bell
Nevada Bighorns Unlimited
Nevada Cattlemen's Association
Nevada Conservation League
Nevada Indian Environmental Coalition
Nevada Mining Association
Nevada Outdoor Recreation Association
Nevada Power Company
Nevada Wilderness Association
Nevada Wilderness Project
Nevada Wildlife Federation
Nevada Woolgrowers Association
Northern Nevada Native Plant Society
Overton Power District
Paiute Pipeline Company
People for the USA
Sierra Club
Sierra Pacific Power Company
Silverdust Racing Association
Southern Nevada Off Road Racing Enthusiasts
Southern Nevada Water Authority
State Multiple Use Advisory Commission for Federal Lands
Trust for Public Land
Virgin Valley Water District
Western Land Exchange
Wild Horse Organized Assistance
Wilderness Society
Wildlife Society, Nevada Chapter
Williams Gas Pipeline
Wyoming Advocates for Animals

Governmental Officials

Shelley Berkley, U.S. House of Representatives
Marcia DeBraga, Nevada State Assembly
John Ensign, U.S. Senate
James A. Gibbons, U.S. House of Representatives
Kenny Guinn, Governor
Mike McGinnis, Nevada State Senate
Harry M. Reid, U.S. Senate

5.5.2 Availability

Copies of the Draft MFP Amendment/Toquop Energy Project DEIS will be available for public inspection at the BLM offices listed below.

Bureau of Land Management
Caliente Field Station
U.S. Highway 93
Caliente, NV 89008-0237

Bureau of Land Management
Carson City Field Office
5665 Morgan Mill Road
Carson City, NV 89701

Bureau of Land Management
Ely Field Office
702 North Industrial Way
Ely, NV 89301-9408

Nevada State Office
1340 Financial Boulevard
Reno, NV 89502-7147

Washington Office of Public Affairs
18th and C Street, N.W.
Washington, D.C. 20240

Copies of the Draft MFP Amendment/DEIS will be available for public inspection at the libraries listed below.

Caliente Branch Library
P.O. Box 306
Caliente, NV 89008

Clark County Library
1401 East Flamingo Road
Las Vegas, NV 89109

Las Vegas Public Library
1726 East Charleston Boulevard
Las Vegas, NV 89104

Lincoln County Library
P.O. Box 330
Pioche, NV 89043

Mesquite Library
121 West 1st North Street
Mesquite, NV 89027

North Las Vegas Library
2300 Civic Center
North Las Vegas, NV 89030

Panaca High School Library
P.O. Box 268
Panaca, NV 89042

University of Nevada-Las Vegas
James R. Dickinson Library
Documents Department
4505 South Maryland Parkway
Las Vegas, NV 89154

University of Nevada-Reno
Getchell Library
Government Publication Dept.
Reno, NV 89507

Washoe County Library
301 South Center Street
Reno, NV 89501

White Pine County Library
950 Campton Street
Ely, NV 89301

5.5 Public Meetings

Four public meetings will be held to receive comments on the DEIS. Dates and locations of these meetings are as follows:

Date	Location
July 8, 2002	Caliente, Nevada
July 9, 2002	Las Vegas, Nevada
July 10, 2002	Mesquite, Nevada
July 11, 2002	Reno, Nevada

5.6 List of Preparers and Reviewers

An interdisciplinary team (EIS ID Team) was formed within the lead agency to provide guidance and direction for preparing the EIS. The EIS ID Team members are listed in Table 5-1. Table 5-2 lists the EIS Core Team members, which represented the BLM Ely Field Office, Toquop Energy, Nevada Land and Resource Company, and CH2M HILL. The purpose of the EIS Core Team was to review interim work products to EIS preparation and to work through specific issues related to EIS preparation. Table 5-3 identifies reviewers from the BLM State Office and the BLM Carson City Field Office. Table 5-4 identifies the EIS Consultant Team, which was responsible for preparing this DEIS.

TABLE 5-1
BLM EIS ID Team

Organization	Team Member	Role
Bureau of Land Management (EYFO)	Mike Baughman (Contractor)	EIS Coordinator
	Brenda Linnell	Realty Specialist/Rights-of-Way
	Pete Rowley (Contractor)	Water Resources Specialist
	Tom Burke	Cultural Resources Specialist
	Gretchen Burris	Wilderness Resources Specialist
	Michael Kuyper	Range Specialist
	Kristin May	Soils Specialist
	Alan B. Shepherd	Natural Resource Specialist
	Jeff Brower	Air and Water Quality Specialist
	David Buhlig	Realty Specialist—Land Exchange
	Karen Prentice	Weeds
	William Smith	Wildlife Biologist

TABLE 5-2
EIS Core Team

Organization	Team Member	Role
Bureau of Land Management	Jeff Weeks	BLM, Ely Field Office, Management Review
	Dan Netcher	BLM Team Lead
	Mike Baughman (Contractor	BLM EIS Project Manager
Toquop Energy	Pat King	Proponent
	Chris Garrett	Proponent
Nevada Land and Resource Company	Don Pattalock	Proponent
CH2M HILL (Contractor)	Tom Haislip	Contractor EIS Project Manager
Lincoln County	Doug Carriger	Proponent

TABLE 5-3
Other Reviewers

Organization	Team Member	Role
Bureau of Land Management Nevada State Office	Brian Amme	Environmental Protection Specialist/ Planning
	Randy McNatt	Fish/Forestry Specialist
	Erick Campbell	Wildlife Biologist
	Jim Stobaugh	Lands Team Lead
	Dennis Samuelson	Realty Specialist
	Bill Brooks	Hydrologist/SMA Specialist
	Pat Barker	State Archaeologist
	Tom Burke	Assistant State Archaeologist
	Paul Myers	Regional Economist
Bureau of Land Management Carson City Field Office	David Buhlig	Realty Specialist—Land Exchange
	Rick Brigham	Wildlife Resource Specialist
	Tom Crawford	Economist
	Jim deLaureal	Soils Specialist
	JoAnn Hufnagle	Realty Specialist—Lands
	Carla James	Minerals Specialist
	Dean Kinerson	Plant Specialist
	Terry Knight	Wilderness Specialist
	Terry Knutson	NEPA/Planning Specialist
	Terry Neumann	HAZMAT Specialist
	Pete Raffetto	Range Specialist
	Jim Schroeder	Water Resource Specialist
	Margaret Waski	Cultural Resource Specialist

TABLE 5-4
EIS Consultant Team

Organization	Team Member	Role
CH2M HILL	Tom Haislip	Project Manager
	Randy Schulze	Toquop Program Manager
	Lynn Foster and Monique Chaisson	EIS Coordinators
	Phil Williams	Scoping and Alternatives Development
	Mark Cochran and Bob Turner	Biological Resources
	Frank Lewis and Eden Britt	Water Resources
	Wendy Haydon, Doug Huxley, Monique Chaisson, and Denny Mengel	Land and Physical Resources
	Wendy Haydon, Fatuma Yusuf, John O'Connor	Socioeconomics
	Regan Giese	Cultural Resources
	Eric Oden	Project Editor
	Janie Iseri	Lead Document Processor
GeoMarine	Mark Slaughter	Cultural Resources

Chapter 6

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Chapter 6.0 References

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Acronyms and Abbreviations

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AAACs	Average Acceptable Ambient Air Concentrations
ACEC	Area of Critical Environmental Concern
ADT	average daily traffic
ADTT	average daily truck traffic
afy	acre-feet per year
AIRFA	American Indian Religious Freedom Act
AML	appropriate management level
APA	Approved Caliente Management Framework Plan Amendment
APE	Area of Potential Effect
APN	Assessor Parcel Number
AQRV	Air Quality Related Value
ARPA	Archeological Resources Protection Act
ATSDR	Agency for Toxic Substances and Disease Registry
ATV	all-terrain vehicle
AUM	animal unit month
BA	Biological Assessment
BEA	Bureau of Economic Analysis
BACT	best available control technology
BIA	U.S. Bureau of Indian Affairs
BLM	Bureau of Land Management
BMPs	best management practices
BO	Biological Opinion
BPI	Building Profile Input Program
BTU	British thermal unit
CAA	Clean Air Act
CARB	California Air Resource Board
CATEF	California Air Toxics Emission Factor

CX	Categorical Exclusion
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO	carbon monoxide
Cogentrix	Cogentrix Energy, Inc.
CRMP	Consolidate Resource Management Plan
CWA	Clean Water Act
dBA	A-weighted decibels
DEIS	draft environmental impact statement
DOI	U.S. Department of the Interior
EA	environmental assessment
EIS	environmental impact statement
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Act
FLEFA	Federal Land Exchange Facilitation Act of 1988
FLPMA	Federal Land Policy and Management Act
FWS	U.S. Fish and Wildlife Service
FY	fiscal year
gal/day/ft	gallons per day per foot
GE	General Electric
GIS	geographic information system
gpm	gallons per minute
GPS	global positioning system
ha	hectare
HAP	hazardous air pollutant
HCP	habitat conservation plan
HMA	herd management area

IMP	Interim Management Policy
ISA	Instant Study Area
ITA	Indian Trust assets
kV	kilovolt
lb/hr	pounds per hour
m/s	meters per second
$\mu g/m^3$	micrograms per cubic meter
MBTA	Migratory Bird Treaty Act
MFP	management framework plan
MFPA	Management Framework Plan Amendment
mg/L	milligrams per liter
mm	millimeter
MMBTU	million BTU
MMscf/yr	million standard cubic feet per year
MOA	memorandum of agreement
mph	miles per hour
MRL	Minimal Risk Levels
MSA	Metropolitan Statistical Area
MW	megawatt
N_2	elemental nitrogen
NAAQs	National Ambient Air Quality Standards
NAGPRA	National American Graves Protection and Repatriation Act of 1990
NCA	Noise Control Act
NDEP	Nevada Division of Environmental Protection
NDEP BAQ	Nevada Division of Environmental Protection Bureau of Air Quality
NDOW	Nevada Division of Wildlife
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NHPA	National Historic Preservation Act

NLRC	Nevada Land and Resource Company LLC
NNHP	Nevada Natural Heritage Program
NOI	Notice of Intent
NO_x	oxides of nitrogen
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NPV	net present value
NRCS	National Resource Conservation Service
NRHP	National Register of Historic Places
NRS	Nevada Revised Statute
NSPS	New Source Performance Standards
NWI	National Wetlands Inventory
O_2	oxygen
O_3	ozone
OHV	off-highway vehicle
OHWM	ordinary high water mark
OSHA	Occupational Safety and Health Administration
PG&E	Pacific Gas & Electric Co.
PM10	particulate matter with mean aerometric diameter smaller then 10 microns
PPA	Pollution Protection Act
ppmv	parts per million by volume
ppmvd	parts per million by volume, dry basis
ppmvw	parts per million by volume, wet basis
PRG	Preliminary Remediation Goals
PSD	Prevention of Significant Deterioration
PTE	potential to emit
REIS	Regional Economic Information System
RFFA	Reasonably Foreseeable Future Actions

RMP	resource management plan
ROD	Record of Decision
ROW	right-of-way
RV	recreational vehicle
SAM	Social Accounting Matrix
SCR	selective catalytic reduction
SDWA	Safe Drinking Water Act
SHPO	State Historic Preservation Office
SIA	significant impact area
SIL	significant impact level
SMA	special management area
SO_2	sulfur dioxide
SOP	standard operating procedure
SPCCP	Spill Prevention, Control, and Countermeasure Plan
SR	State Route
ST	steam turbine
TCP	traditional cultural property
TDS	total dissolved solids
Toquop Energy	Toquop Energy, Inc.
tpy	tons per year
TUP	Temporary Use Permit
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
USGS	United States Geological Survey
VOCs	volatile organic compounds
VRM	Visual Resource Management
WSA	Wilderness Study Area
WSCC	Western Systems Coordinating Council
yr	year

Glossary

Glossary

Access (road)	Road used for passage to project sites and along utility corridors for purposes of construction, operation, and maintenance.
Acre-foot	Volume of water (43,560 cubic feet) that would cover 1 acre, 1 foot deep. Equivalent to 325,851.3 gallons.
Aesthetic quality	A perception of the beauty of a natural or cultural landscape.
Affected environment	Existing biological, physical, social, and economic conditions of an area subject to change, both directly and indirectly, as the result of a proposed human action.
Air quality	Measure of the health-related and visual characteristics of the air, often derived from quantitative measurements of the concentrations of specific injurious or contaminating substances.
Air quality classes	Classifications established under the Prevention of Significant Deterioration (PSD) portion of the Clean Air Act that limit the amount of air pollution considered significant within an area. Class I applies to areas where almost any change in air quality would be significant; Class II applies to areas where the deterioration normally accompanying moderate well-controlled growth would be permitted; and Class III applies to areas where industrial deterioration would generally be allowed.
Alternative (action)	An option for meeting the stated purpose and need.
Alternative (route)	An optional path or direction for a road, pipeline, or transmission line.
Alluvial, alluvium	Relating to material deposited by running water, such as clay, silt, sand, and gravel. Sedimentary material transported and deposited by the action of flowing water.
Alluvial fan	Cone-shaped deposits of alluvium made by a stream. Fans generally form where streams emerge from mountains onto the lowland.
Ambient	The surrounding natural conditions (or environment) in a given place and time.

Animal Unit Month (AUM)	The amount of forage necessary for the sustenance of one cow or its equivalent (one cow, bull, steer, heifer, horse, burro, mule, five sheep, or five goats over the age of 6 months at the time of entering the public lands or other lands administered by BLM) for a period of 1 month.
Aquatic	Growing or living in or near the water.
Aquifer	A stratum or body of permeable rock, sand, etc. that contains water. Water source for a well.
Archaeology	The scientific study of the life and culture of ancient peoples, as by excavation of ancient cities, relics, or artifacts.
Area of Critical Environmental Concern	A BLM designation for an area within public lands where special management attention is required to protect and prevent irreparable damage to important historic, cultural, or scenic values; fish and wildlife resources, or other natural systems or processes; or to protect life from natural hazards.
Artifact	Any object showing human workmanship or modification, especially from a prehistoric or historic culture.
Assessment (environment)	An evaluation of existing resources and potential impacts on them from a proposed act or change to the environment.
Avifauna	Birds of a specified region or time.
Cambrian	The earliest geologic period in the Paleozoic Era, spanning the time of 570 to 500 million years ago, and marked by a profusion of marine animals.
Candidate species	A plant or animal species not yet officially listed as threatened or endangered, but which is undergoing status review by the USFWS.
Capability	The ability to generate or transmit power.
Capacity	The maximum load that can be generated or transmitted by generating or transmission facilities for a given period of time without exceeding approved limits of temperature or stress.
Clean Water Act	Provides for pollution control activities and funding at the federal level including grant programs, research and related programs, as well as provisions for setting standards and enforcement actions.

Council on Environmental Quality	An advisory council to the President established by the National Environmental Policy Act of 1969. It reviews federal programs for their effort on the environment studies, and advises the President on environmental matters.
Cubic feet per second	Unit of discharge, or volume rate of flow, equal to 0.0283 cubic meters per second. As a rate of streamflow, a cubic foot of water passing a referenced section in 1 second. A measure of a moving volume of water (1 cfs = 0.0283 m^3/s).
Cultural resources	A broad, general term meaning any cultural property reflecting past human activity or use that has a definite location, and any traditional lifeway value important to a contemporary social and/or cultural group's traditional systems of religious belief, cultural practices, or social interaction.
Cumulative impact	The impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions—regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time (40 CFR 1508.7).
Demand	The energy requirement (load) placed upon a utility's generation at any specific point in time. A utility's demand (energy needed) increases and decreases instantaneously as consumers turn their electrical appliances on or off. Demand is increased or decreased in such terms as watts, kilowatts, and megawatts.
Draft Environmental Impact Statement	A detailed written statement as required by Section 102(2)(c) of NEPA.
Effect (also see Impact)	
Direct effect	Caused by the action and occurs at the same time and place (40 CFR 1508.8(a)).
Indirect effect	Caused by the action later in time or farther removed in distance, but still reasonably foreseeable. Indirect effects may include: growth inducing effect and other effects related to induced changes in the pattern of land use; population density or growth rate; and related effects on air and water and other natural systems, including ecosystems.
Electric and magnetic field	A space or region within which magnetic forces are present around an electrical current.

Emergent (vegetation)	Vegetation with all or part of their vegetative and reproductive parts above the water.
Endangered species	Any species in danger of extinction throughout all or a significant portion of its range.
Endemic	Plants or animals that are native to a particular region or country.
Environment	The surrounding conditions, influences or forces that affect or modify an organism or an ecological community and ultimately determine its form and survival.
Environmental Impact Statement	A formal public document prepared to analyze the impacts on the environment of the proposed project or action and released for comment and review. An EIS must meet the requirements of NEPA, CEQ guidelines, and directives of the agency responsible for the proposed project or action.
Environmental Impact Statement, Final	The final version of the public document required by NEPA.
Ephemeral	Present only during a portion of the year. Generally refers to water courses.
Evapotranspiration	The combined loss of water from a given area and during a specific period of time by evaporation from the soil surface and by transpiration from plants.
Fault	A fracture or fracture zone in the earth's surface along which there has been displacement of the sides relative to one another.
Fauna	The wildlife or animals of a specified region or time.
Federal Energy Regulatory Commission	Agency primarily responsible for ensuring adequate energy supplies at just and reasonable rates and providing regulatory incentives for increased productivity, efficiency, and competition.

Federal Land Policy and Management Act of 1976	Public Law 94-579 signed by the President on October 21, 1976. Established public land policy for management lands administered by the Bureau of Land Management (BLM). FLPMA specifies several key directions for the BLM, notably: 1) management on the basis of multiple use and sustained yield; 2) land use plans prepared to guide management actions; 3) public lands for the protection, development, and enhancement of resources; 4) public lands retained in federal ownership; and 5) public participation used in reaching management decisions.
Floodplain	That flat portion of a river or stream valley adjacent to the river channel that is built of sediments and is inundated with water when the stream overflows its banks.
Fossil	The remains or traces of an organism or assemblage of organisms that have been preserved by natural processes in the earth's crust.
Generation	Process of producing electrical energy by transforming other forms of energy; also, amount of electric energy produced, expressed in kilowatt hours.
Geologic formation	A rock unit distinguished from adjacent deposits by some common physical characteristic, such as its composition, origin, color, or age.
Geology	The science that studies the earth. The materials, processes, environments, and history of the planet, especially the lithosphere, including the rocks and their formation and structure.
Habitat	The region where a plant or animal naturally grows or lives. A specific set of physical conditions that surround a single species, a group of species, or a large community. In wildlife management, the major components of habitat are considered to be food, water, cover, and home range.
Hydrology	The science that studies the properties, distribution, and circulation of natural surface water and ground water.
Impact	A modification in the status of the environment brought about by a proposed action.

Infrastructure	The basic installations and facilities on which the continuance and growth of a community depend (for example, roads, schools, sewers, power plants, transportation, and communication systems).
Isolate/Isolated Artifact	A single artifact, feature, or object not associated with other cultural resources. An isolate is not normally considered a property.
Kilovolt	1,000 volts (a volt is a measure of electrical potential difference that would cause a current of 1 ampere to flow through a conductor whose resistance is 1 ohm).
Kilowatt	A unit of power equivalent to 1,000 watts.
Landform	A term used to describe the many types of land surfaces that exist as a result of geologic activity and weathering (for example, plateaus, mountains, plains, and valleys).
Lithic	Pertaining to stone or a stone tool (for example, lithic artifact).
Lithology	The appearance, structure, and composition of rocks as determined by study with the unaided eye or with little magnification.
Megawatt	1,000 kilowatts or 1 million watts (a watt is a unit of electrical power equal to 1/756th horsepower).
Mesa	An isolated, nearly level land mass, formed of nearly horizontal rocks, standing above the surrounding country and bounded with steep sides.
Migratory	Birds, animals, or people, that migrate or move from one region or country to another.
Milligauss	A unit of measurement for magnetic fields.
Mineral resource	Any inorganic or organic substance occurring naturally in the earth that has a consistent and distinctive set of physical properties. Examples of mineral resources include coal, nickel, gold, silver, and copper.
Mississippian	A period of the Paleozoic Era, spanning in time from about 345 to 320 million years ago.
Mitigate	To alleviate, reduce, or render less intense or severe.

Mitigation	Action taken to avoid, reduce the severity of, or eliminate an adverse impact.
National Ambient Air Quality Standards	Air quality standards established by the Clean Air Act. The primary NAAQS are intended to protect the public health with an adequate margin of safety; the secondary NAAQS are intended to protect the public welfare from any known or anticipated adverse effects of a pollutant.
National Environmental Policy Act of 1969	Public Law 91-190. Establishes environmental policy for the nation. Among other items, NEPA requires federal agencies to consider environmental values in decision-making processes.
National Register of Historic Places	A listing of architectural, historical, archaeological, and cultural sites of local, state, or national significance, established by the Historic Preservation Act of 1966 and maintained by the National Park Service.
Native vegetation	Vegetation originating in a certain region or country.
Nonattainment area	An air quality control region (or portion thereof) in which the U.S. Environmental Protection Agency has determined that ambient air concentrations exceed national ambient air quality standards for one or more criteria pollutants.
100-year flood	A flood with a magnitude that may occur once every 100 years on average. An area has a 1-in-100 chance of being inundated during any single year.
Ozone	A form of oxygen, O_3, produced especially when an electric spark is passed through oxygen or air.
Paleontology	The science that deals with the life of past geological ages through the study of the fossil remains of organisms.
Paleozoic	The geologic era between the Precambrian and Mesozoic eras covering the time between 550 million and 225 million years ago. The era was characterized by the development of the first fishes, amphibians, reptiles, and land plants.
Particulates	Minute, separate particles, such as dust or other air pollutants.
Pennsylvanian	A period of the Paleozoic Era, spanning from about 320 million to 280 million years ago.
Perennial	Lasting, or active through the whole year. May refer to rivers, streams, or plants.

Permeability	The measure of the ease with which a fluid can diffuse through a particular porous materials.
Permian	The seventh and last period of the Paleozoic Era, spanning from about 280 to 225 million years ago, characterized by increased reptile life and major mountain building in North America.
Petroglyph	A symbolic design or drawing or an animal or human pecked or carved into a rock or cliff face—generally prehistoric.
Physiographic Province	A large area characterized by distinctive topography, geologic structure, and other features and phenomena of nature.
Plateau	An elevated tract of relatively level land, such as a tableland or large mesa.
Playa	The shallow central lake basin of a desert plain, in which water gathers after a rain and is evaporated.
Pleistocene	The first geologic epoch during the Quaternary period, spanning from 1.8 million years ago to approximately 10,000 years ago, characterized by extensive continental glaciation in the Northern Hemisphere.
Policy	A guiding principle upon which is based a specific decision or set of decisions.
Power	Measure of the amount of energy (work) being used at a specific point in time. Power is measured in such terms as watts, kilowatts, and megawatts. Power implies capacity in addition to energy.
Precambrian	The earliest geologic era covering all time from the formation of the earth and ending at the Paleozoic Era, which began about 520 million years ago.
Primitive	An area that is not developed, a pristine natural area.
Quaternary	The geologic period following the Tertiary in the Cenozoic Era, beginning about 1.8 million years ago, composed of the Pleistocene and Holocene epochs, characterized by the evolution of Hominids into modern humans.
Range	A large, open area of land over which livestock can wander and graze.
Raptor	A bird of prey.

Rare	A plant or animal restricted in distribution. May be locally abundant in a limited area or few in number over a wide area.
Reclamation	Returning disturbed lands to a form and productivity that will be ecologically balanced.
Region	A large trace of land generally recognized as having similar character types and physiographic types.
Revegetation	The reestablishment and development of self-sustaining plant cover. On disturbed sites, this normally requires human assistance such as reseeding.
Right-of-way	Strip of land acquired by legal means, over which the utility corridors and access roads would pass.
Sacred site	Any specific, discrete, narrowly delineated location on Federal land identified by an Indian tribe, or Indian individual determined to be an appropriately authoritative representative of an Indian religion, as sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion; provided that the tribe or appropriately authoritative representative has informed the agency of the existence of such a site.
Scenic quality class	The designation (A, B, or C) assigned a scenic quality rating unit to indicate the visual importance or quality of a unit relative to other units within the same physiographic province (BLM designation).
Scenic quality rating unit	A portion of the landscape that displays primarily homogeneous visual characteristics of the basic landscape features (landform, water, vegetation, and structures and modifications) that separate it from the surrounding landscape.
Sediment	Solid fragmental material, either mineral or organic, that is transported or deposited by air, water, gravity, or ice.
Seismicity	The relative frequency and distribution of earthquakes.
Semiarid	A climate or region characterized by little yearly rainfall and by the growth of a number of short grasses and shrubs.
Sensitive species	Species whose populations are small and widely dispersed or restricted to a few localities. Species that are listed or candidates for listing by the state or federal government.

Sensitivity	The state of being readily affected by the actions of external influence.
Site	In archaeology, any locale showing evidence of human activity.
Socioeconomic	Of or involving both social and economic factors.
Species	A group of individuals of common ancestry that closely resemble each other structurally and physiologically, and in nature interbreed to produce fertile offspring.
Spring	A place where ground water flows naturally onto the land surface; often the source of a stream.
Strata	Plural of stratum, which is a layer of sedimentary rock that was originally deposited horizontally.
Study area	A given geographical area delineated for specific research.
Subspecies	Any natural subdivision of a species that exhibits small, but persistent morphological variations from other subdivisions of the same species living in different geographical regions or times.
Substrate	Sediment that lies beneath the surface of the earth.
Take	A prohibited action under federal law, except where authorized. To harass, harm, pursue, hunt, wound, kill, trap, capture, or collect a federally listed threatened or endangered species, or to attempt to do so. Take may include disturbance of the listed species, nest, or habitat, when disturbance is extensive enough to disrupt normal behavioral patterns for the species, although the affected individuals may not actually die.
Talus	A pile of rock debris at the foot of a cliff or steep slope.
Tertiary	The first period in the Cenozoic Era, spanning from 65 to 1.8 million years ago characterized by the development of mammals.
Threatened species	Any species likely to become endangered within the foreseeable future throughout all or a significant part of its range.
Topography	The relative positions and elevations of surface features of an area.

Traditional cultural property	A term referring to a tangible site, district, structure, building, or object with defensible boundaries that is important to a contemporary human community and has been for 50 years or more, that has significance under one or more criteria of the National Register of Historic Places, and with integrity of location, design, setting, materials, workmanship, feeling, and association in the perspective of those who value the place.
Triassic	The first period in the Mesozoic Era, spanning from 225 to 190 million years ago and following the Permian Period of the Paleozoic Era; characterized by the first appearance of many reptiles, including the dinosaurs.
Tributary	A stream or river that flows into a larger stream or river.
Utility corridor	A route used by a utility for pipelines and transmission lines.
Vegetation community	Species of plants that commonly live together in the same region or ecotone.
View shed	Visible portion of the specific landscape seen from a specific viewpoint, normally limited by landform, vegetation, distance, and existing cultural modifications.
Visual resource management class	Classification of landscapes according to the kinds of structures and changes that are acceptable to meet established visual goals (BLM).
Waters of the United States	All waters that are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce including adjacent wetlands and tributaries to waters of the United States; and all waters by which the use, degradation, or destruction of which would affect or could affect interstate or foreign commerce.
Wetlands	Lands or areas exhibiting hydric soils, saturated or inundated soil during some portion of the plant growing season, and plant species tolerant of such conditions (includes swamps, marshes, bogs).

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Appendix A

Measures for Protecting Desert Tortoises and Their Habitat

APPENDIX A

Measures for Protecting Desert Tortoises and Their Habitat

The following protective measures will be implemented during project construction, operation, and maintenance to prevent impacts and the potential for impacts to desert tortoises and their habitat. These measures are an integral part of the Proposed Action and Alternatives 1 and 2.

1. A qualified desert tortoise biologist must be present from March 15 through October 15 (active season) in areas that have not been enclosed with tortoise proof fence during surface-disturbing activities to ensure that desert tortoises are not inadvertently harmed, unless the U.S. Bureau of Land Management (BLM) and the U.S. Fish and Wildlife Service (FWS) have determined that the presence of a biologist is unnecessary. The biologist shall be on-call from October 16 through March 14 (inactive season) and must check construction areas immediately before construction activities begin at all times.

2. If fence construction occurs during the tortoise active season, a qualified tortoise biologist shall be onsite during construction of the tortoise-proof fence to ensure that no tortoises are harmed. During the active season temporary or permanent tortoise-proof fencing will be required to be installed for all areas of surface disturbing activities prior to the onset of construction activities. If the fence is constructed during the tortoise inactive season, a biologist will thoroughly examine the proposed fence line and burrows for the presence of tortoises no more than 3 days before construction commences.

3. Any desert tortoises or eggs found in the fence line will be relocated offsite by a qualified tortoise biologist in accordance with approved protocol (Desert Tortoise Council 1994, revised 1999). Tortoise burrows that occur immediately outside of the fence alignment that can be avoided by fence construction activities shall be clearly marked to prevent crushing.

4. Permanent fencing to exclude tortoise will be required on the access road from Interstate 15 to the proposed plant site. In accordance with current specifications, fencing shall consist of 1-inch-horizontal by 2-inch-vertical mesh. The mesh shall extend at least 18 inches above ground and, where feasible, 6 to 12 inches below ground. In situations where it is not feasible to bury the fence, the lower 6 to 12 inches of the fence shall be bent at a 90-degree angle towards potentially approaching tortoises and covered with cobble or other suitable material to ensure that tortoises or other animals cannot dig underneath and create gaps that allow passage. Tortoise undercrossings will be provided at intervals of not greater than 1 mile. It is anticipated that only 2 or 3 undercrossings specifically placed for tortoises will be needed to meet this objective since most of the access road is in terrain that will require frequent culverts for drainage purposes that can also be designed to function as tortoise crossings.

5. The fence shall be inspected on a quarterly basis. Any repairs shall be completed within 72 hours from March 15 through October 15, and within 7 days from October 16 through

March 14. The operator shall inspect the fencing at least on a quarterly basis and after major precipitation events to ensure zero ground clearance. Monitoring and maintenance shall include regular removal of trash and sediment accumulation and restoration of zero ground clearance between the ground and the bottom of the fence, including re-covering the bent portion of the fence if not buried. The operator shall perform maintenance when needed, including removing trash, sediment accumulation, and other debris. Fencing may be removed upon termination and reclamation of the project, or when it is determined by the BLM and FWS that the fence is no longer necessary.

6. During surface-disturbing activities, tortoise burrows shall be avoided whenever possible. If a tortoise is found onsite during project activities that may result in take of the tortoise (harm, displace, harass, wound, trap, capture, or kill), such activities shall cease until the tortoise moves or is moved. The tortoise shall be moved by a qualified tortoise biologist. All workers shall also be instructed to check underneath all vehicles before moving such vehicles, and also within stockpiled materials. Tortoises often take cover under vehicles and construct burrows in stockpiled material.

7. Construction sites, staging areas, and access routes shall be cleared by a qualified tortoise biologist before the start of construction. The project area shall be surveyed for desert tortoise using survey techniques that provide 100 percent coverage. From March 15 through October 15, the preconstruction clearance shall take place no more than 3 days prior to initiation of construction; from October 16 through March 14, the preconstruction clearance shall take place no more than 10 days prior to initiation of construction. All desert tortoise burrows, and other species' burrows that may be used by tortoises, will be examined to determine whether the burrow is occupied by desert tortoises. Tortoise burrows shall be cleared of tortoises and eggs, and collapsed. Any desert tortoises or eggs found in the fenced area will be removed under the supervision of a qualified tortoise biologist in accordance with FWS protocol (Desert Tortoise Council 1994, revised 1999).

8. The BLM must approve the selected consulting firm/biologist to be used by the applicant to implement the terms and conditions of rights-of-way (ROWs) issued by the BLM. Any biologist and/or firm not previously approved must submit a curriculum vitae and be approved by the BLM before being authorized to represent the BLM in meeting compliance with the terms and conditions of the ROWs. Other personnel may assist with implementing terms and conditions that involve tortoise handling, monitoring, or surveys, only under direct field supervision by the approved qualified biologist.

9. Tortoises and nests shall be handled and relocated by a qualified tortoise biologist in accordance with FWS-approved protocol (Desert Tortoise Council 1994, revised 1999). Burrows containing tortoises or nests shall be excavated by hand, with hand tools, to allow removal of the tortoise or eggs. Desert tortoises moved during the tortoise inactive season or those in hibernation, regardless of date, must be placed into an adequate burrow; if one is not available, one shall be constructed in accordance with Desert Tortoise Council (1994, revised 1999) criteria. During mild temperature periods in the spring and early fall, tortoises removed from the site shall not necessarily be placed in a burrow. Tortoises and burrows shall only be relocated to federally managed lands. If the responsible federal agency is not the BLM, verbal permission, followed by written

concurrence, shall be obtained from BLM and FWS before relocating the tortoise or eggs to lands not managed by the BLM.

10. Tortoises that are moved offsite and released into undisturbed habitat on public land must be placed in the shade of a shrub, in a natural unoccupied burrow similar to the hibernaculum in which it was found, or in an artificially constructed burrow in accordance with an FWS-approved protocol (Desert Tortoise Council 1994, revised 1999).

11. After a project has been fenced and a tortoise clearance completed, if a desert tortoise is encountered in imminent danger, it shall be moved out of harm's way and onto adjacent BLM land by personnel that have completed the training required in Terms and Conditions 8.h of the Desert Tortoise Council (1994, revised 1999) criteria.. If the tortoise cannot be avoided or moved out of harm's way onto BLM land, it shall be placed in a cardboard box or other suitable container and held in a shaded area until BLM personnel can retrieve the tortoise.

12. If possible, overnight parking and storage of equipment and materials, including stockpiling, shall be in previously disturbed areas or areas to be disturbed that have been cleared by a tortoise biologist. If not possible, areas for overnight parking and storage of equipment shall be designated by the tortoise biologist.

13. All vehicular traffic shall be restricted to existing access roads, or those roads approved by the BLM in consultation with the FWS.

14. Project activity areas shall be clearly marked or flagged at the outer boundaries before the onset of construction. All activities shall be confined to designated areas. Blading of vegetation shall occur only to the extent necessary and shall be limited to areas designated for that purpose by the BLM or tortoise biologist.

15. Prior to issuance of any federal permit, lease, or authorization for any surface-disturbing activity, the project proponent shall pay a remuneration fee for each acre of surface disturbance. The amount and disposition of said fee shall be determined in consultation with the BLM and FWS.

    This fee will be paid directly to the Desert Tortoise Public Lands Conservation Fund Number 730-9999-2315, administered by Clark County or any other administrator approved by both the FWS and BLM. The administrator serves as the banker of these funds and receives no benefit from administering these funds. These funds are independent of any other fees collected by Clark County for desert tortoise conservation planning.

The payment shall be accompanied by the *Section 7 Fee Payment Form* and completed by payee. The project proponent or applicant may receive credit for payment of such fees and deduct such costs from desert tortoise impact fees charged by local government entities. Payment shall be by certified check or money order payable to Clark County (or other administrator named by the BLM and FWS), and delivered to the following:

Clark County
Department of Comprehensive Planning
500 South Grand Central Parkway, Third Floor
Las Vegas, NV 89155-1712
Attn: Desert Plan Administrator

In addition, a copy of the form will be accompanied by a payment verification and delivered to the following:

The Bureau of Land Management
Ely Field Office
HC 33 Box 33500
Ely, NV 89301-9408
Attn: Field Manager

16. Projects resulting in residual impacts shall require the submission of a BLM- and FWS-approved reclamation plan, unless determined by the BLM and FWS that reclamation rehabilitation is not necessary. The reclamation/rehabilitation plan will describe objectives and methods to be used, species of plants and/or seed mixture to be used, time of planting, success standards, and follow-up monitoring. Depending upon the size and location of the project, reclamation could simply involve recontouring; rehabilitation and restriction of access points; or intensive reclamation over the entire area of surface disturbance. The plan shall be prepared within 60 days following completion of the surface disturbance phase of the project. Reclamation shall be addressed on a case-by-case basis.
17. Upon receipt of an application or expression of interest in the expansion of a materials site right-of-way within desert tortoise ACECs, the BLM shall notify the FWS and initiate a 60-day evaluation period. During the evaluation period, the BLM and FWS will consider options to minimize impacts to desert tortoise habitat, such as relocation of areas outside ACECs, other potential sources, and other measures.
18. If a substantial level of disturbance occurs within a desert tortoise ACEC (for example, expansion of materials sites within ACECs), the proponent will rehabilitate an equivalent number of acres with an ACEC in the same recovery unit, within 6 months, or relinquish a similar area back to the BLM. These actions will occur in addition to payment of remuneration fees and other minimization measures in this biological opinion.
19. A litter-control program shall be implemented to minimize predation on tortoises by ravens drawn to the project site. This program shall include the use of covered, raven-proof trash receptacles, removal of trash from project areas to the trash receptacles

following the close of each work day, and proper disposal of trash in a designated solid waste disposal facility. Appropriate precautions must be taken to prevent litter from blowing out along the road when trash is removed from the site. A litter-control program shall be implemented by the responsible federal agency or their contractor, to minimize predation on tortoises by ravens and other predators drawn to the project.

20. A tortoise-education program shall be presented to all personnel working on the project or activities associated with the project. This program shall be presented by a qualified tortoise biologist. The program shall include information on the life history of the desert tortoise, legal protection for desert tortoises, penalties for violations of federal and state laws, general tortoise-activity patterns, reporting requirements, measures to protect tortoises, terms and conditions of the BLM-issued ROWs, and personal measures that employees can employ to promote the conservation of desert tortoises. The definition of "take" will also be explained. Specific and detailed instructions will be provided on the proper techniques to capture and move tortoises that appear onsite, in accordance with USFWS-approved protocol. Currently, the FWS-approved protocol is Desert Tortoise Council (1994, revised 1999).

21. The project applicant shall notify the BLM's authorized project officer at least 10 days before initiation of any project. Notification shall be made to the BLM staff in Caliente at (775) 726-8100, or Ely at (775) 289-1800.

22. The BLM (775/726-8100- Caliente, or 775/289-1800- Ely), and the FWS's Southern Nevada Field Office (702/647-5230) must be notified of any desert tortoise death or injury resulting from project implementation by close of business on the following work day. In addition, the FWS's Division of Law Enforcement shall be notified in accordance with reporting requirements.

23. All appropriate Nevada Division of Wildlife (NDOW) permits or letters of authorization shall be acquired prior to handling desert tortoises and their parts, and prior to initiation of any activity that may require handling tortoises.

24. The project proponent must submit a document to the BLM within 30 days of completion of the project, showing the number of acres disturbed; remuneration fees paid; and number of tortoises taken, which includes capture and displacement, killed, injured, and harassed by other means, during project activities covered under the biological opinion.

25. All projects to be covered under the Biological Opinion shall be reviewed by the BLM's wildlife staff to ensure that appropriate measures have been incorporated into the BLM authorization (for example, material site, land sale, or OHV event) to minimize the potential take of desert tortoise and loss of habitat.

26. The BLM will keep an up-to-date log of all actions taken under consultation; number of acres affected; results of tortoise survey and removal activities (including reported number of desert tortoises injured, killed, or removed from project site); date, rate (per acre adjusted for inflation) and amount of fees paid for each project; and progress of recovery actions. The BLM will provide information to the FWS's Southern Nevada

Field Office annually. Annual reports will be due on February 1, for the previous calendar year in which actions were covered under the biological opinion. Information will be cumulative throughout the life of the consultation. Annual reports shall include maps showing the location of actions within ACEC's authorized under the opinion and other information required in the biological opinion. .

27. For those actions identified in this biological opinion that require concurrence between the BLM and the FWS, written notification of proposed changes or actions will be made a minimum of 30 days in advance. Both agencies will coordinate to the maximum extent practicable to achieve resolution. This may include informal meetings to discuss proposed actions and reach concurrence, or written correspondence.

28. In accordance with *Procedures for Endangered Species Act Compliance for the Mojave Desert Tortoise*, a qualified desert tortoise biologist should possess a bachelor's degree in biology, ecology, wildlife biology, herpetology, or closely related fields as determined by the BLM. The biologist must have demonstrated prior field experience using accepted resource agency techniques to survey for desert tortoises and tortoise sign, which should include a minimum of 60 days of field experience. All tortoise biologists shall comply with the FWS-approved handling protocol prior to conducting tasks in association with terms and conditions of the biological opinion. In addition, the biologist shall have the ability to recognize tortoise sign and accurately record survey results.

29. A BLM respresentative(s) will be designated to be responsible for overseeing compliance with the reasonable an prudent measures, terms, and conditions, reporting requirements, and re-initiation requirements jointly agreed to by BLM and FWS. The designated representative shall provide coordination among the permittee, project proponent, the BLM, and the FWS.

Appendix B

Standard Construction and Operation Procedures

APPENDIX B

Standard Construction and Operation Procedures

This appendix describes a number of standard procedures intended to reduce the potential for short- and long-term impacts. These procedures will be implemented during construction and operation of all features of the Toquop Energy Project. Each of these procedures will be incorporated into all construction specifications and contract documents, as appropriate, and all contractors will be required to follow them. These procedures are an integral part of the Proposed Action and Alternatives 1 and 2.

Landscape Preservation and Impact Avoidance

1. To the maximum extent practicable, all trees, native shrubs, and other vegetation will be preserved and protected during construction operations and equipment except where clearing operations are required for permanent structures, approved construction roads, and excavation operations.
2. To the maximum extent practicable, all maintenance yards, field offices, and staging areas will be arranged to preserve trees, shrubs, and other native vegetation.
3. Clearing will be restricted to that area needed for construction.
4. All areas around structures will be backfilled, compacted, and returned as close as possible to the original condition and grade.
5. In order to reduce environmental damage, washes, steep slopes, or sensitive environmental areas will not be used for equipment or materials storage or stockpiling; construction staging or maintenance; field offices; hazardous material or fuel storage, handling, or transfer; or temporary access roads.
6. Excavated or graded materials will not be stockpiled or deposited on or within 100 feet of any steep slopes (defined by industry standards) or washes (including seasonally active ephemeral drainages.
7. The width of all new permanent access roads will be kept to the absolute minimum needed for operation, avoiding sensitive areas and trees where possible, and limiting disturbance to vegetation.
8. When and where applicable, landscaping standards, including clearing of native vegetation, will be followed as prescribed by local land use and management agencies when work is within their jurisdictions.

Erosion and Sediment Control

1. Planting native grasses, forbs, trees, or shrubs beneficial to wildlife, or placing riprap and other materials as appropriate, will be used to prevent and minimize the potential for

erosion and siltation during construction of project features and during the period needed to reestablish permanent vegetative cover on disturbed sites. Sediment fences will be used where appropriate to limit wind and water erosion, and water trucks will be used in disturbed areas during construction to limit wind erosion.

2. Final erosion control and site restoration measures will be initiated as soon as a particular area is no longer needed for construction, stockpiling, or access. Clearing schedules will be arranged to minimize exposure of soils.
3. Cuts and fills for access roads and utility corridors will be sloped to prevent landslides and to facilitate revegetation.
4. Signs will be placed along the access road to discourage OHV use of adjacent areas.
5. Borrow areas will be contoured and shaped to carry the natural contour of adjacent undisturbed terrain into the borrow area.
6. Soil or rock stockpiles, excavated materials, or excess soil materials will not be placed near sensitive habitats, including washes, where they may erode into these habitats or be washed away by high water or storm runoff. Plastic will be placed over stockpiles to prevent wind erosion if the stockpiles are intended to be long-term. Waste piles will be revegetated using suitable native species after they are shaped to provide a natural appearance.
7. Treading on areas not immediately involved in project construction activities will be avoided to reduce potential wind erosion and fugitive dust generated during construction.

Pipeline and Utility Corridor Construction

1. Construction rights-of-way (ROWs) will be limited to the minimum practicable width.
2. The upper 12 to 18 inches of soil will be removed from the trench area and stockpiled for later use.
3. Surface elevations will be returned to pre-project conditions, taking into account expected settling.
4. Where the pipeline crosses fences, a wire gate will be installed to standard BLM specifications. The gates will be built prior to the corridor construction, and will be kept closed except during active construction at the fence site.
5. If construction activities cause damage to existing range improvements (such as pipelines, fences, troughs, etc.), they will be fixed using material that meets or exceeds the quality of the existing improvement. If damage occurs the BLM and livestock operator will be notified immediately. If damage occurs during active livestock grazing, repairs will be made within 24 hours.

6. Big Galleta grass will be included within the seed mix used to revegetate the disturbed corridor.

Biological Resources

1. Specific measures that will be implemented to protect desert tortoises and their habitat are described in Appendix A.

2. Bird nests encountered during land disturbing construction activities will be avoided while the birds are fledging. To the extent practicable, land disturbing construction activities will be scheduled outside of the breeding season (March 15 through July 30). If construction is required during the breeding season, the area impacted will be surveyed for nests prior to construction.

3. Collapsing suitable burrows or other potential nesting cavities within the construction zone prior to the nesting season can largely prevent direct impacts that may otherwise occur on burrowing owls. This will be accomplished, where appropriate, as part of the surveys for the desert tortoise. If owl-occupied burrows are located during their nesting or brooding season (mid-March through August), burrows will be avoided until the young owls leave the nest or it is determined that the nesting attempt failed.

4. Gila monsters in immediate danger from construction activities will be captured and confined in a cool, shaded environment by a biologist in accordance with NDOW regulations. Injured Gila monsters will be transferred to a veterinarian. Dead Gila monsters will be preserved for NDOW.

5. Impacts to chuckwalla will be minimized by restricting activity in upland areas occupied by this species. Chuckwallas typically hide in rock crevices and other similar shelters when approached or threatened, making it difficult to capture and relocate them. However, trained personnel will remove them prior to construction if necessary.

6. If significant bat roosts are located within or adjacent to a construction zone, the roost will be avoided until the animals naturally vacate the site. Certain types of bat refuges, such as winter roosts used by non-hibernating California leaf-nosed bats, will be completely avoided if practicable. Certain naturally occurring caves, and even some abandoned mines, can provide the necessary temperature regimes critical to maintaining some local bat populations.

7. Signs warning of bighorn sheep crossing will be placed along the access road in order to reduce potential mortalities resulting from collisions with vehicles.

8. Agency review and assessment of project-associated impacts on vegetation may precipitate a mitigation requirement to salvage various plants located inside the construction zone. Protected or otherwise sensitive plants (such as Joshua trees and numerous species of cactus and yuccas) will have to be identified and removed from the construction corridor prior to the onset of construction. Salvaged plants will then be held for replanting along construction zone margins, other project-affected areas (for example,

former equipment staging grounds), or alternate lands. Plant salvage activities will probably have the greatest likelihood for success if carried out in other than the spring flowering season.

9. Vegetation salvage and replanting will be implemented and completed as required by the BLM in accordance with their established guidelines. Adopting roadway signage that discourages off-road travel will help protect vegetation along road margins.

10. The project proponent will adhere to an integrated pest management plan prepared for the project.

Cultural Resources

Appendix C of this document contains the Cultural Resources Programmatic Agreement between BLM and the Nevada SHPO for the Toquop Energy Project. This Programmatic Agreement contains stipulations to ensure that those historic and prehistoric properties eligible for nomination to the National Register of Historic Places will be treated to avoid or mitigate project-related effects to the extent practicable and to satisfy BLM Section 106 responsibilities.

Reclamation

1. Reclamation will normally be accomplished with native species only. These will be representative of the indigenous species present in the adjacent habitat. Rationale for potential planting with selected non-natives will be documented. Possible exceptions could include use of non-natives for a temporary cover crop to out-compete weeds.

2. Seeding will occur during November 15 through March 15 to ensure a greater chance of success.

3. Reclamation release criteria are as follows:

    - 100 percent of the perennial plant cover of selected comparison areas, normally like adjacent habitat. If the adjacent habitat is severely disturbed, a range site description may be used as a cover standard. Cover is normally crown cover as estimated by the point intercept method. Selected cover can be determined using a method as described in *Sampling Vegetation Attributes, Interagency Technical Reference* (1996, BLM/RS/ST-96/002+1730). The reclamation plan for the project area will identify the site-specific release criteria and associated statistical methods in the reclamation plan or permit.

    - No noxious weeds will be allowed on the sites for reclamation release. Control of noxious weeds will follow an integrated pest management plan approved by the authorizing officer. A list of Nevada noxious weeds will be provided by the authorized officer.

4. All available growth medium will be salvaged and stockpiled prior to disturbance. All disturbance areas will be recontoured to blend as nearly as possible with the natural topography prior to revegetation. All compacted portions of the disturbance will be ripped to a depth of 12 inches unless solid rock is encountered. Adequate, fine-grain seedbed must be established to provide good seed to soil contact. Large blocks and clumps of soil with deep pockets should be avoided. This normally requires some type of tillage procedure after ripping.

5. All portions of access roads not needed for other uses as determined by the authorized officer will be reclaimed.

6. Mulching of the seedbed following seeding may be required under certain conditions, such as severe erosion.

7. The success of the vegetative growth on a reclaimed site may be evaluated for release no sooner than during the third growing season after earthwork and planting have been completed. Where it has been determined that revegetation success criteria have not been met, the agencies and the operator will meet to decide on the best course of actions necessary to meet the reclamation goal.

8. Where applicable, the following agencies will be consulted to determine the recommended plant species composition, seeding rates, and planting dates:
   - U.S. Fish and Wildlife Service (FWS)
   - U.S. Natural Resources Conservation Service (NRCS)
   - U.S. Bureau of Land Management (BLM)

9. Grasses, forbs, shrubs, and trees appropriate for site conditions and surrounding vegetation will be included on the plant list. Species chosen for a site will be matched for site drainage, climate, shading, resistance to erosion, soil type, slope, aspect, and vegetation management goals. Upland revegetation shall match the plant list to the site's soil type, topographic position, elevation, and surrounding natural communities.

10. Construction areas, including storage yards, will be free of waste material and trash accumulations at all times.

11. All unused materials and trash will be removed from construction and storage sites during the final phase of work. All removed material will be placed in approved sanitary landfills or storage sites and work areas will be left to conform to the natural landscape.

12. Upon completion of construction, any land disturbed will be graded to provide proper drainage and blend with the natural contour of the land. Following grading, it will be revegetated using plants native to the area, suitable for the site conditions, and beneficial to wildlife.

13. Following completion of construction, all yards, offices, and construction buildings, including concrete footings and slabs, will be removed from the site.

14. All temporary construction roads will be obliterated and restored to the original contour, and made to discourage vehicular traffic when no longer needed by contractors. Culverts will be removed as appropriate, road escarpments will be contoured and vegetated, and all road surfaces will be scarified to establish conditions appropriate for reseeding, drainage, and erosion prevention.

Visual Resources

1. All structures, stacks, buildings, and tanks will be constructed of materials that will restrict glare, and will be finished with flat tones intended to blend with the surrounding environment. The project applicant will consult with Lincoln County and BLM regarding the final selection of colors for the features of the property.
2. All fencing will be constructed of nonreflective materials, and will be treated or painted to blend with the surrounding environment.
3. Signs at the plant site will be constructed of materials that are nonglare, and will be painted using unobtrusive colors.
4. Lighting will be limited to areas required for safety and security, and will be shielded and directed downward to the extent possible.
5. Lighting will be directed and shielded to reduce light scatter and glare. Highly directional, high-pressure sodium vapor fixtures (or other fixtures that meet the criteria specified) will be used where practicable.
6. Switches will be used as appropriate to allow use of lighting only when needed.
7. The transmission structures would be finished with flat, neutral gray tones that would relate to the colors of the structures in the existing transmission corridors and that would blend with the surrounding environment.
8. Nonspecular conductors and nonreflective and nonrefractive insulators would be used to reduce conductor and insulator visibility.

Water Pollution Prevention and Monitoring

1. A groundwater monitoring plan will be developed by Toquop Energy and approved by BLM. Results of monitoring will be provided to the FWS and the Nevada State Engineer annually.
2. Pumped ground water will be monitored periodically to ensure its quality is suitable for power plant operation.
3. All federal and state laws related to control and abatement of water pollution will be complied with. All waste material and sewage from construction activities or project-related features will be disposed of according to federal and state pollution control regulations.

4. Activity with a high potential for causing sediment movement into washes will not be conducted during potentially high runoff periods, typically July and August.

5. All disturbed ephemeral washes considered to be waters of the United States will be reclaimed as soon as possible according to the conditions of a Section 404 Clean Water Act Permit. The highest standards for aesthetic value will be adhered to during restoration of the washbed. Where appropriate and as required by conditions of the Section 404 Permit, native species capable of bank stabilization will be used to revegetate all disturbed banks.

6. Diversion structures will be used to re-direct flows from the wash potentially impacted by the southern plant site and will be designed to minimize potential destabilization and erosion of adjacent and downgradient ephemeral washes.

7. Stormwater management plans will be implemented for project construction and facility operation to minimize and control erosion from stormwater runoff. Stormwater during project construction will be managed in compliance with applicable state and federal regulations, including compliance with requirements of the National Pollutant Discharge Elimination System (NPDES) stormwater general permits, which will be obtained for the project. Stormwater management elements will include:

    - Application of best management practices for erosion, sedimentation, and stabilization control during construction activities, and management of oils and other substances during operation to minimize contact with stormwater

    - Structural controls during operation that could include stabilized stormwater conveyance systems (swales), oil-water separators for runoff that comes in contact with affected plant site surfaces, and sedimentation detention basins

    - Monitoring and maintenance to ensure long-term effectiveness of the management system.

8. A stormwater retention basin will be constructed with sufficient dimensions to accommodate runoff from the impervious surfaces at the plant site generated by the local maximum daily rainfall event with a return frequency of 100 years or less. All runoff from the impervious surfaces will be directed to this retention basin prior to being released to the natural drainage system at flow rates equivalent to pre-development conditions. Stormwater runoff likely to contain contaminants will flow first to onsite treatment facilities (such as an oil-water separator), as appropriate, prior to being directed to the stormwater retention basin.

9. Construction specifications will require construction methods that prevent entrance or accidental spillage of pollutants into flowing or dry watercourses, and ground water sources. Potential pollutants and wastes include refuse, garbage, cement, concrete, sewage effluent, industrial waste, oil and other petroleum products, aggregate processing tailings, mineral salts, drilling mud, and thermal pollution.

10. Any construction wastewater discharged into surface waters will be essentially free of settling material. Wastewater from aggregate processing, concrete batching, or other construction operation will not enter drainages without water quality treatment. Turbidity control methods may include settling ponds; gravel-filter entrapment dikes; recirculation systems for washing aggregates; or other approved methods.

Transportation

To improve traffic flow at the one-lane underpass at the East Mesa Interchange during project construction, vehicles coming from opposing sides of the underpass will be required to give the right-of-way to the vehicle that arrived first at the underpass, in accordance with current traffic laws. At certain times during project construction (such as periods of heavy traffic at the underpass resulting from materials/equipment delivery coupled with construction worker transport vehicles and non-project traffic) traffic management will be implemented that could include, but not be limited to, the following:

1. Providing a traffic flag person at both ends of the one-lane underpass to direct traffic during periods of heavy traffic flow.
2. Scheduling project vehicles during peak construction periods so that they arrive at the one-lane underpass at intervals considered suitable to provide smooth traffic flow patterns.
3. Scheduling materials/equipment vehicle deliveries so that they do not arrive at the one-lane underpass during the beginning or end of a work shift.
4. See Noise and Air Pollution Prevention for traffic-related SOPs.

Noise and Air Pollution Prevention

1. Contractors will be required to comply with all applicable federal, state, and local laws and regulations concerning prevention and control of noise and air pollution. Contractors are expected to use reasonably available methods and devices to control, prevent, and reduce atmospheric emissions or discharges of atmospheric contaminants and noise.
2. Contractors will obtain applicable air quality permits before starting construction or operating equipment that will result in regulated atmospheric emissions. The approvals require best available control technology for regulated emissions vented through stacks and vents and sources of fugitive dust emissions. Methods such as wetting exposed soil or roads with water or chemical dust suppressants where dust is generated by passing vehicles will be employed.

3. Contractors will be required to reduce dust from construction operations and prevent it from causing a nuisance to people. To accomplish this, the following measures will be implemented:

   - For the duration of construction activities, actively disturbed areas will be stabilized through the use of wet suppression as required to meet ambient air quality standards. Surfactants may be used to aid in wet suppression, thereby reducing the volume of water required to effectively treat the site. Disturbed areas of the site, including storage piles not being actively used for a period of 1 week or longer, will be stabilized as appropriate to minimize dust emissions. Active stabilization may not be required if soil moisture or natural crusting is sufficient to limit ambient impacts.

   - Bulk material stored onsite that is a possible fugitive dust source will be actively wetted, as needed, to minimize ambient impacts. It is anticipated that the majority of the material will be used onsite upon arrival. Should bulk materials require onsite storage for an extended period of time, the application of active wet suppression or the installation of a porous wind fence will be used as necessary to minimize fugitive dust generation.

   - Many of the unpaved surfaces, such as onsite access roads, will be covered with gravel and watered as necessary to minimize dust generation.

   - Onsite fugitive dust emissions will be limited by reducing vehicle speeds and a combination of active and passive dust suppression measures. Additional mitigation practices will include the following:

     - Onsite access roads, parking lots, and lay-down areas will be maintained with a gravel cover to the maximum extent practical.

     - Traffic off maintained onsite access roads will be restricted and a posted speed limit of 15 miles per hour will be enforced to minimize emissions from unpaved road segments.

     - Unpaved road segments will be watered as necessary.

     - Gaseous emissions from mobile sources will be minimized by proper maintenance and tune-up of equipment.

Hazardous Material Storage, Handling, and Disposal and Safety Measures

1. Contractors will be required to comply with Nevada State Regulations established under the authority of the Federal Resources Conservation and Recovery Act of 1976.

2. As necessary, process wastewater solid precipitant will be transported for disposal at a licensed landfill. Solid precipitant stored onsite will be covered until transported offsite for disposal.

3. Aboveground chemical tanks will be located within a containment structure that is paved and bermed, and that is sufficient to contain a release from the largest tank within the area, plus sufficient freeboard to prevent overflow. Tanks will be registered, constructed, and managed using accepted engineering best practices, which may include high-level alarms or indicators to prevent overflow and locking valves. Tanks will be subject to a regular inspection regime.

4. The potential for adverse impacts from oil and fuel spills will be reduced through careful handling and designation of specific equipment repair and fuel storage areas.

5. Outdoor oil storage areas will be bermed with a capacity sufficient to contain the oil inventory contained in the single largest tank/equipment plus sufficient freeboard to prevent overflow. These areas will be equipped with a normally locked valve. Regular inspections will determine if there had been a leak requiring special attention. Otherwise, the valve will be opened to drain any rainwater to a plant oil/water separator. Any oil collected in the separator will be pumped out and removed by a licensed oil disposal contractor.

6. Outdoor chemical and hazardous waste storage areas will be within diked containment areas. Chemicals and wastes will be stored in accordance with the fire safety, hazardous materials management, and hazardous waste management standards of practice, which include segregation of incompatibles, protection of water-reactive materials from precipitation or moisture, adequate aisle space, etc.

7. Waste materials known or found to be hazardous will be disposed of in approved treatment or disposal facilities in accordance with federal, state, and local regulations, standards, codes, and laws.

8. Solid waste will be stored in closed onsite roll-off bins. Recyclable materials will be separated from the solid waste stream. Solid waste will be collected periodically and transported to a local licensed landfill.

9. Generation of wastes during construction will be minimized through detailed estimating of materials needed and through efficient construction practices. Any wastes generated during construction will be recycled as much as feasible. Concrete waste will be used as fill onsite, or, if not suitable for reuse, will be removed to a local licensed landfill. Any non-recyclable wastes will be collected and transported to a local licensed landfill.

10. Fuels, lubricant chemicals, and welding gases used during construction will be in controlled storage until used. Any empty containers or waste material will be segregated in storage and properly recycled or disposed of by licensed handlers.

11. Concrete trucks will not be washed at construction sites. All spilled concrete will be removed from construction areas and disposed of properly.

12. Portable toilets will be provided for onsite sewage handling during construction and will be pumped out and cleaned regularly. Sewage will be treated onsite during operation of the power plant.

13. A Spill Prevention Control and Countermeasures Plan (SPCCP) will be put in place for project features and include the following:

    - Program components and assignments
    - Professional engineer certification coordinator
    - Site information
    - Site drainage and storm water management
    - Emergency procedures/spill response
    - Emergency reporting contacts
    - Tank schematics
    - Material safety data sheets
    - Management approval
    - Plans reviews and amendments
    - Personnel training
    - Reporting procedures/emergency reporting contacts
    - Site inspections
    - Notice to tank truck drivers
    - Spill, fire, and safety equipment

14. Operators of the Toquop Energy Project will provide onsite fire and emergency medical equipment and services; and develop a police, fire, and medical aid agreement with Lincoln County to provide additional personnel and services to the project site.

15. To minimize the exposure of personnel and equipment to potential flood hazards, construction activities in the washes will be scheduled to occur when the probability for flash flooding is minimal.

Appendix C

Cultural Resources Programmatic Agreement

Programmatic Agreement Among the USDI Bureau of Land Management, Nevada and the Nevada State Historic Preservation Officer Regarding the Toquop Energy Project

PROGRAMMATIC AGREEMENT
AMONG
THE USDI BUREAU OF LAND MANAGEMENT, NEVADA
AND
THE NEVADA STATE HISTORIC PRESERVATION OFFICER
REGARDING THE TOQUOP ENERGY PROJECT

WHEREAS, the BLM is considering an application for rights of ways and a proposed land exchange for the Toquop Energy Project proposed by Toquop Energy, Inc., ("Toquop") in southern Lincoln County, Nevada, and BLM is preparing an Environmental Impact Statement for this proposed project.

WHEREAS, the BLM has determined that if it approves this application and/or the land exchange, the construction and installation of the Toquop Energy Project (the undertaking) may have an effect upon properties eligible for inclusion in the National Register of Historic Places (NRHP), and has consulted with the Nevada State Historic Preservation Officer (SHPO) pursuant to the Nevada BLM/SHPO Protocol for implementing Section 106 of the National Historic Preservation Act;

WHEREAS, Toquop Energy, Inc., the operator of Toquop Energy Project, participated in the consultation and has been invited to concur in this Programmatic Agreement, and

WHEREAS, this Programmatic Agreement covers all aspects of the planning, construction, and installation of the undertaking, including but not limited to, power and communication transmission systems, generation stations, staging areas and access roads, the construction zone, extra work areas and all ancillary facilities;

NOW THEREFORE, the parties agree that development of the Toquop Energy Project, if it is approved by BLM, shall be administered in accordance with the following stipulations to ensure that historic and prehistoric properties will be treated to avoid or mitigate effects to the extent practicable, regardless of surface ownership, and to satisfy BLM Section 106 responsibilities for all aspects of the undertaking.

AREA OF POTENTIAL EFFECT

The Area of Potential Effect (APE) shall be defined to include all potential direct and indirect effects to cultural resources and Traditional Cultural Properties from any Toquop Energy Project activities associated with the undertaking, if it is approved by BLM. The initial specific APE is described and mapped in Appendix A. At the discretion of the BLM, the APE may be amended as needed and any amendments will be handled under the terms of this agreement.

STIPULATIONS

A. Identification

1. BLM shall identify interested persons and tribes pursuant to the BLM/SHPO Protocol and involve them, as appropriate, in all activities associated with the undertaking.

2. The BLM, in consultation with the SHPO, shall ensure that Toquop funds an appropriate cultural resource inventory, including reports, of the APE for all activity areas, or portions thereof, in a manner consistent with the BLM/SHPO Protocol.

3. Required inventory shall be completed regardless of the ownership (public or private) of the lands involved and Toquop shall be responsible for gaining access to privately held lands. Toquop's failure to gain access to private lands will result in a determination of adverse effect for the undertaking.

4. When found, previously recorded sites will be re-recorded using Intermountain Antiquities Computer System (IMACS) site record forms.

5. No artifacts will be collected during inventory activities.

6. Isolated artifacts and features will be documented in tabular form using the description, land form, legal location, and UTM.

B. Eligibility

1. The BLM, in consultation with the SHPO, shall ensure that all cultural resources located within the APE of an activity area are evaluated for eligibility to the NRHP prior to the initiation of activities that may affect cultural properties. Eligibility will be determined in a manner compatible with BLM/SHPO Protocol.

a. In addition, the BLM shall consult with appropriate tribes to identify properties considered to be of traditional religious and cultural importance.

2. To the extent practicable, eligibility determinations shall be based on inventory information. If the information gathered in the inventory is inadequate to determine eligibility, Toquop, through its contractors may need to conduct limited subsurface testing, or other evaluative techniques, to determine eligibility. Subject to approval by the BLM, in consultation with the SHPO, evaluative testing is intended to provide the minimum data necessary to define the nature, density and distribution of materials in potential historic properties, to make final evaluations of eligibility, and to devise treatment options responsive to the information potential of the property. Any such testing shall be limited to disturbing no more than 25% of the surface area of the resource. Should BLM disapprove the applications for the Toquop project, or should Toquop abandon the project and withdraw its applications prior to BLM approval, then any further evaluative testing shall cease, except for completing existing or already authorized work that is ongoing as of the date of withdrawal or disapproval.

3. If the BLM and SHPO disagree regarding eligibility, the BLM shall seek a formal determination of eligibility from the Keeper of the National Register in accordance with

36 CFR 800.4 (dated 1986). The Keeper's determination will be considered final.

C. Treatment

1. In avoiding or mitigating effects, the BLM, in consultation with SHPO and interested persons, shall determine the precise nature of effects to historic properties identified in the APE if the Toquop Project is approved by BLM. As a condition to any grant of rights of way or other BLM action to approve the Toquop Project, appropriate treatment shall be required prior to construction or operation of the Project. If the Project is approved by BLM, all treatment shall be done in a manner consistent with the BLM/SHPO Protocol.

2. If the Toquop Project is approved by BLM, to the extent practicable, BLM, in consultation with the SHPO, shall ensure that Toquop avoids effects to historic properties through project design, or redesign, relocation of facilities, or by other means in a manner consistent with the BLM/SHPO Protocol.

3. If the Toquop Project is approved by BLM, when avoidance is not feasible, the BLM, in consultation with SHPO, Toquop and interested persons, shall ensure that Toquop develops an appropriate treatment plan designed to lessen or mitigate project-related effects to historic properties. The treatment plan shall be a condition to the right of way, if the right of way is approved by BLM. For properties eligible under criteria (a) through (c) (36 CFR 60.4), mitigation, other than data recovery, may be considered in the treatment plan (e.g. HABS/HAER recordation, oral history, historic markers, exhibits, interpretive brochures or publications, etc.). Where appropriate, treatment plans shall include provisions (content and number of copies) for a publication for the general public.

4. If the Toquop Project is approved by BLM, when data recovery is proposed and required as a condition of approval, the BLM, in consultation with the SHPO, shall ensure that Toquop develops a data recovery plan that is consistent with the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (48 FR 44716-37) and *Treatment of Historic Properties: A Handbook* (Council 1980).

6. If the Toquop Project is approved by BLM, upon completion of the consultation process, the BLM shall require as a condition of approval and ensure that Toquop, through its contractor, implements the fieldwork portions of any final treatment plan prior to initiating any activities that may affect historic properties

7. The BLM shall ensure that all records and materials resulting from identification and treatment efforts are curated in accordance with 36 CFR 79 in BLM-approved facilities in Nevada. All materials collected will be maintained in accordance with 36 CFR 79 until the final treatment report is complete and collections are curated or returned to their owners.

8. The BLM shall ensure that all final archeological reports resulting from actions pursuant to this Agreement will be provided to the SHPO and the Advisory Council on Historic Preservation (Council), and made available to other interested persons. All such reports shall be consistent with contemporary professional standards, and the Department of Interior's Formal Standards for Final Reports of Data Recovery Programs (42FR 5377-79).

D. Discovery Situations

1. If the Toquop Project is approved by BLM, and authorization has been granted for Toquop to proceed to construct or operate the undertaking, the following requirements shall apply. When cultural resources are discovered, undertaking-related activities within 100 meters of the discovery will cease immediately and Toquop shall notify the BLM authorized officer. Prior to initiating any activities within the APE, Toquop will provide the parties with a list of, and schedule for, the Toquop employees empowered to halt all activities in discovery situation and who will be responsible for notifying BLM of any discoveries. At least one of these employees will be present during all Toquop's activities.

(a) The BLM shall notify the SHPO and consider the SHPO's initial comments on the discovery. Within two working days of the discovery, the BLM shall notify Toquop, the SHPO and identified interested persons, of the BLM's decision to either allow undertaking-related activities to proceed or to require mitigation.

(b) If, in consultation with the SHPO, BLM determines that mitigation is appropriate, the BLM shall solicit comments from the SHPO and interested persons, as appropriate, to develop mitigating measures. The SHPO and other interested persons, as appropriate, will be allowed two working days to provide BLM with comments to be considered when the BLM makes a decision on extent of mitigative efforts. BLM will determine the mitigation required; within seven working days of BLM's notification to Toquop of the need for mitigation, BLM will notify the SHPO and appropriate interested persons of its decision and ensure that such mitigative actions are implemented.

(c) The BLM shall ensure that reports of mitigation efforts for discovery situations are completed in a timely manner and conform to the Department of Interior's Formal Standards for Final Reports of Data Recovery Program (42 FR 5377-79). Drafts of such reports shall be submitted to the SHPO for a 30-day review and comment as stipulated in H.2. Final reports shall be submitted to the SHPO, Council and interested persons for informational purposes.

(d) Toquop's activities in the area of the discovery will be halted until Toquop is notified by the BLM that mitigation is complete and activities can resume.

E. Other Considerations

1. The BLM shall ensure that all stipulations of this Agreement are carried out by the BLM, SHPO, Toquop, and all of its contractors or other personnel.

2. The BLM shall ensure that historic, architectural, and archaeological work conducted pursuant to this Agreement is carried out by, or under the direct supervision of persons meeting qualifications set forth in the Secretary of the Interior's Professional Qualification Standards (36 CFR 61) and who have been permitted for such work on public lands, by the BLM.

3. Toquop, in cooperation with the BLM and the SHPO, shall ensure that all its personnel, and all the personnel of its contractors, are directed not to engage in the illegal collection of historic and prehistoric materials. Toquop shall cooperate with the BLM to ensure compliance with the Archaeological Resources Protection Act of 1979 (16 U.S.C. 470) on public lands and with Nevada statute NRS 383 for state and private lands.

4. Toquop shall bear the expense of identification, evaluation, and treatment of all cultural properties directly or indirectly affected by Toquop Energy Project-related activity. Such costs shall include, but not be limited to, pre-field planning, field work, post-fieldwork analysis, research and report preparation, interim and summary report preparation, publications for the general public, and the cost of curating project documentation and artifact collections. It is understood that BLM may decide not to approve the right of way applications or the land exchange for the Toquop Energy Project. Prior to any BLM decision to approve or disapprove the applications, Toquop has agreed to bear the expense of the identication and evaluation of cultural properties required as part of the cultural resources surveys necessary to obtain information for the Environmental Impact Statement. If BLM disapproves the applications, or if Toquop abandons or withdraws its pending application for right of way prior to a BLM decision, then Toquop shall bear no further expense for evaluation or treatment for any cultural properties except for completing existing or already authorized work that is ongoing as of the date of withdrawal or disapproval.

5. Identification, evaluation and treatment efforts may extend beyond the geographic limits of the right-of-way when the resources being considered extend beyond the right-of-way. No identification, evaluation or treatment efforts will occur beyond that necessary to gather data for the completion of the Section 106 process as agreed, prior to BLM's decision to approve or disapprove the submitted applications. If BLM disapprove the applications, or if the applications are withdrawn or abandoned, then no further identification, evaluation or treatment will occur except for completing existing or already authorized work that is ongoing as of the date of withdrawal or disapproval. .

6. Traditional Cultural Properties (TCPs) will be identified, evaluated, and treated through consultation with appropriate interested persons. Toquop can contract for data gathering to assist the BLM in identifying, evaluating and treating TCPs. However, formal consultation, as needed, will be done by the BLM. TCP identification, evaluation

and treatment efforts shall be consistent with BLM Manual 8160 and its associated handbook.

7. Information on the location and nature of all cultural resources, and all information considered to be proprietary by tribes, will be held confidential to the extent provided by the NHPA, NAGPRA, and ARPA.

8. The BLM shall ensure that any human remains, grave goods, items of cultural patrimony, and sacred objects, encountered during the undertaking are treated with the respect due such materials. In coordination with this Agreement, human remains and associated grave goods found on public land will be handled according to the provisions of the Native American Graves Protection Act (NAGPRA) and its implementing regulations (43 CFR 10). Human remains and associated grave goods found on state or private land will be handled according to the provisions of Nevada statute NRS 383.

9. The BLM and the Nevada State Historic Preservation Office (SHPO) have consulted formally and have discussed informally about various aspects of the Toquop Energy Project. In relation to the land exchange included as part of the Proposed Action (Appendix A), the BLM and SHPO have consulted and agreed that the area of Section 36, T.11S, R.69E, has been subject to cultural resources inventory adequate to identify the likelihood of historic properties, pending determination of whether any Traditional Cultural Properties are present. The BLM anticipates consultation with SHPO regarding a BLM proposal to subject Section 4, T.10S, R.69E to a Class 2-level cultural resources inventory. The BLM expects that the remainder of the proposed and alternative alignments, including those areas yet to be defined, will be subjected to Class 3 cultural resources inventory.

F. Monitoring

1. The BLM and the SHPO may monitor actions carried out pursuant to this Agreement.
2. Any areas that the BLM, in consultation with the SHPO, identifies as sensitive will be monitored by an appropriate professional or tribal representative during construction activities that may impact the area, if the applications are approved by BLM. Treatment Plans will contain monitoring plans as needed. Monitors shall be empowered to stop work to protect resources.

G. Notices to Proceed

If BLM decides to approve the submitted applications, the right of ways issued under these applications shall provide for the issuance of Notices to Proceed. Notices to Proceed (NTP) may be issued by the BLM to Toquop for individual construction activities as defined by Toquop in its Construction Plan, under any of the following conditions:

(a) the BLM and SHPO have determined that there are no cultural resources within the APE for the construction segment;

(b) the BLM and SHPO have determined that there are no historic properties within the APE for the construction segment; or

(c) the BLM after consultation with the SHPO and interested persons has implemented an adequate treatment plan for the construction segment, and

(1) the fieldwork phase of the treatment option has been completed;

(2) the BLM has accepted a summary description of the fieldwork performed and a reporting schedule for that work; and

(3) Toquop has posted a surety as stipulated in I. below for post-fieldwork costs of the treatment plan.

H. Time Frames

1. Reports: The BLM shall review and comment on any report submitted by Toquop within 30 calendar days of receipt.

2. Consultation with Interested Parties: Prior to SHPO consultation, the BLM shall submit the results of all identification and evaluation efforts, including discovery situations, and treatment plans to identified interested persons for a 30-day review and comment period.

3. SHPO Consultation: The BLM shall submit the results of all identification and evaluation efforts, including discovery situations, and treatment plans to the SHPO for a 30-day review and comment period.

4. If any party to the agreement, or other interested person fails to respond to the BLM within 30 days of the receipt of a submission, the BLM shall presume concurrence with the BLM's findings and recommendations as detailed in the submission and proceed accordingly.

5. Reports: A draft final report of all identification, evaluation, treatment or other mitigative activities will be due to the BLM within nine (9) months after the completion of the fieldwork associated with the activity, unless otherwise negotiated.

6. Curation: All records, photographs, maps, field notes, artifacts, and other materials collected or developed for any identification, evaluation, or treatment activities will be curated in a facility approved by the BLM at the time the final report associated with that activity is accepted by the BLM, unless materials and artifacts must be returned to the owner.

I. Surety Bonds

1. If BLM decides to approve the applications for rights of ways, the terms of the rights of way(s) issued by BLM shall provide for the posting of sureties after such approval for the protection of cultural properties, as set forth below. If BLM decides to disapprove the application, then no surety shall be provided. Under the terms of any BLM approval of the proposed undertaking, Toquop will post a surety with the BLM in an amount sufficient to cover all post-fieldwork costs associated with implementing a treatment plan or other mitigative activities, as negotiated by Toquop when they contract for services in support of this Agreement. Such costs may include, but are not limited to post-field analyses, research and report preparation, interim and summary reports preparation, and the curation of project documentation and artifact collections in a BLM-approved curation facility. The surety shall be posted prior to BLM issuing a notice to proceed.

2. The surety posted as provided in Section I (1) above shall be subject to forfeiture if the post-fieldwork tasks are not completed within the time period established by the treatment option selected; provided, however, that the BLM and Toquop may agree to extend any such time periods. The BLM shall notify Toquop that the surety is subject to forfeiture and shall allow Toquop 15 days to respond before action is taken to forfeit the surety.

3. The surety shall be released, in whole or in part, as specific post-fieldwork tasks are completed and accepted by the BLM.

J. Dispute Resolution

1. If any party to this agreement, or an interested person, objects to any activities proposed pursuant to the terms of this agreement, the BLM shall consult with the objecting party and the SHPO to resolve the issue. If the objection cannot be resolved at the local level, the BLM shall request the assistance of the Council to help resolve the objection.

2. The Parties may continue all actions under this Agreement that are not the subject of the dispute.

K. Amendment

Any party to this Agreement may request that this Agreement be amended, whereupon the Parties will consult to consider such amendment.

L. Termination

Any party to this Agreement may terminate the Agreement by providing thirty (30) days notice to the other Parties, provided that the Parties will consult during the period prior to termination to seek agreement on amendments or other actions that would avoid termination.

M. Execution

1. Execution and implementation of this Agreement evidences that the Parties have satisfied their Section 106 responsibilities for all actions associated with the construction and installation of Toquop Energy Project.

2. In the event that the Parties do not carry out the requirements of this Agreement or it is terminated, the BLM will comply with the provisions of the BLM/SHPO Protocol.

3. This Agreement shall become effective on the date of the last signature below, and shall remain in effect until terminated as provided in Stipulation L, or until undertaking is completed, or three years from the effective date.

CONSULTING PARTIES:

BUREAU OF LAND MANAGEMENT, NEVADA

By: Date: 2/8/02

Title: Ely Field Manager

NEVADA STATE HISTORIC PRESERVATION OFFICE

By: Alice M Baldrica Date: 2/19/02

Title: Deputy SHPO

CONCURRING PARTY:
TOQUOP ENERGY, INC.

By: Date: 02/6/02

Title: Its Authorized Agent

Christopher W. Garrett

APPENDIX A: AREA OF POTENTIAL EFFECT

The Toquop Energy Project includes three alternatives other than the No Action Alternate. These are discussed briefly below and are depicted in the attached figures.

The Proposed Action (or Southern Alternative) includes improvements (paving, widening, some straightening) to12.2 miles of existing Entry Road extending from Interstate Highway 15 in Clark County and into a proposed plant site in Lincoln County, Nevada; a land exchange of the federally-administered area of Section 36, T.11S, R.69E (Proposed Plant Site) in return for the privately-owned Section 9, T.20N, R.23E, in the Pah Rah Range in Washoe County, Nevada; construction of a natural gas-fired, water-cooled electrical generating facility in the Proposed Plant Site; construction of an underground Water Pipeline and related utility corridor to carry cooling water from Tule Basin to the proposed power plant site; and drilling of several water wells in the Well Field at locations that are yet to be determined, with connections between each well and the north end of the Water Pipeline within Section 4, T.9S, R.69E. However, the wells and their pipeline locations cannot be determined at present (November 2001) pending accumulation of additional information. The Proposed Action includes connections to both an existing natural gas pipeline (Kern River) as well as an existing electrical transmission line (Navajo-McCullough) within Section 36.

Alternative 1 is identical to the Proposed Action except for utilization of an eastern alignment for the Water Pipeline. This route is slightly longer (12.4 miles) and involves crossing Toquop Wash in order to avoid a nearby Area of Critical Environmental Concern.

Alternative 2 would involve development of the electrical generating plant in Section 4, T.10S, R.69E, which would be substituted as the federally-owned component utilized for the land exchange to acquire the privately-owned area of Section 9, T.20N, R.23E, in the Pah Rah Range in Washoe County, Nevada. The southern portion of the Entry Road would stay the same into Section 36, T.11S, R.69E, and would extend northward to Section 4 following the eastern alignment discussed in Alternative 1. The requirements for water wells in the Tule Desert remain the same, as would the connections between those wells and the alternative electrical generating plant site. The greatest difference would be in the requirement to connect between the electrical generating plant location in Section 4 and the natural gas supply and electrical transmission lines to the south. This would include improvements such as widening and paving along an additional 13.4 miles of road, as well as construction of 13.2 miles of buried gas line and an electrical transmission interconnection.

Appendix D

U.S. Fish and Wildlife Service Section 7 Consultation Letter: Species List for the Proposed Toquop Energy Project, Lincoln and Clark Counties, Nevada

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DEC -4 '01

RT	OFFICE	INIT	DATE
	D.M.		
	RR		
	NRR		
	SS		
	CA1		
	FIRE		
	C.F.		

Comments:

United States Department of the Interior

FISH AND WILDLIFE SERVICE
NEVADA FISH AND WILDLIFE OFFICE
1340 FINANCIAL BOULEVARD, SUITE 234
RENO, NEVADA 89502

November 29, 2001
File No. 1-5-02-SP-431

Memorandum

To: Field Manager, Ely Field Office, Bureau of Land Management, Ely, Nevada
(Attn: Dan Netcher, Team Leader)

From: Field Supervisor, Nevada Fish and Wildlife Office, Reno, Nevada

Subject: Species List for the Proposed Toquop Energy Project, Lincoln and Clark Counties, Nevada

Attached is a list of threatened and endangered species for the proposed Toquop Energy Project in Lincoln and Clark counties, Nevada. Attachment A lists those threatened and endangered species that *may* be present within, or in the vicinity, of this area. The attached species list applies to all three alternatives for the proposed Toquop Energy Project (the Proposed Action, Alternative # 1, and Alternative # 2).

This fulfills the requirement of the U.S. Fish and Wildlife Service to provide information on threatened and endangered species pursuant to section 7(c) of the Endangered Species Act of 1973, as amended (Act), for projects that are authorized, funded, or carried out by a Federal agency. Please reference the species list file number shown above in all subsequent correspondence concerning this project.

Attachment A also lists the species of concern to the Nevada Fish and Wildlife Office that may occur in the project area. We have used information from State and Federal agencies and private sources to assess the conservation needs and status of these species. Further biological research and field study are needed to resolve the conservation status of these taxa. One potential benefit of considering these species during project planning, is that by exploring alternatives early in the planning process, it may be possible to provide long-term conservation benefits for these species and avoid future conflicts that could otherwise develop. We also recommend that you contact the Nevada Natural Heritage Program (1550 East College Parkway, Suite 145, Carson City, Nevada 89710, 775-687-4245) and the appropriate regional office of the Nevada Division of Wildlife, as well as other local, State, and Federal agencies for distribution data and information on conservation needs on these and other species of concern that may occur in your project area. Potential impacts to species of concern should be considered during the environmental documentation process.

The designation of critical habitat for the federally-endangered Virgin River chub and woundfin in the Virgin River was published in the Federal Register on January 26, 2000 (65 FR 4140). Since critical habitat for these two species occurs in the general vicinity of the proposed energy project, critical habitat should be considered when determining the effects of the proposed project on the Virgin River fishes. In particular, we are concerned with the possible effects of groundwater use on surface flows in the Virgin River, by facilities that would be constructed for the proposed Toquop Energy Project.

Although the project facility occurs outside designated critical habitat for the desert tortoise, the proposed road that would access the facility would traverse desert tortoise critical habitat (see attachments B-1, B-2, and B-3). Construction of the road would result in the loss of an unknown number of acres of critical habitat and may provide new public access to the area. The *Desert Tortoise (Mojave Population) Recovery Plan* recommends blocks of habitat that are roadless or otherwise inaccessible to humans, as a component of the reserve design for desert tortoise recovery areas. We are concerned that access roads such as the one proposed, will substantially impact the desert tortoise and its critical habitat. Thus, we encourage the Bureau of Land Management and project proponent to develop measures to minimize adverse effects to tortoise to the greatest extent practicable. We are available to assist with your efforts.

Because this project is located in or near a major wash, we ask that you be aware of potential impacts project activities may have on waters of the United States. Discharge of dredged or fill material into wetlands or waters of the United States is regulated by the Army Corps of Engineers pursuant to section 404 of the Clean Water Act. We recommend you contact the Regulatory Section of the Army Corps of Engineers' Reno Field Office (300 Booth Street, Room 2120, Reno, Nevada 89509, 775-784-5304) regarding the possible need for a permit.

Should you have further questions, please contact Jeri Krueger of the Southern Nevada Field Office, at (702) 647-5230.

Cynthia T. Martinez

for Robert D. Williams

Attachments

ATTACHMENT A

LISTED SPECIES, CANDIDATE SPECIES, AND SPECIES OF CONCERN THAT MAY OCCUR WITHIN THE VICINITY OF THE PROPOSED TOQUOP ENERGY PROJECT, LINCOLN AND CLARK COUNTIES, NEVADA

File Number: 1-5-02-SP-431
November 29, 2001

Listed and Candidate Species

Birds

Yellow-billed cuckoo, Western Distinct Population Segment (C)	*Coccyzus americanus*
Southwestern willow flycatcher (E)	*Empidonax traillii extimus*
Yuma clapper rail (E)	*Rallus longirostris yumanensis*

Fishes

Virgin River chub (E) ✦	*Gila seminuda*
Woundfin (E) ✦	*Plagopterus argentissimus*

Reptile

Desert tortoise (T) ✦	*Gopherus agassizii*

E = Endangered; T = Threatened; C = Candidate
✦ Critical habitat designated in Nevada

Species of Concern

Birds

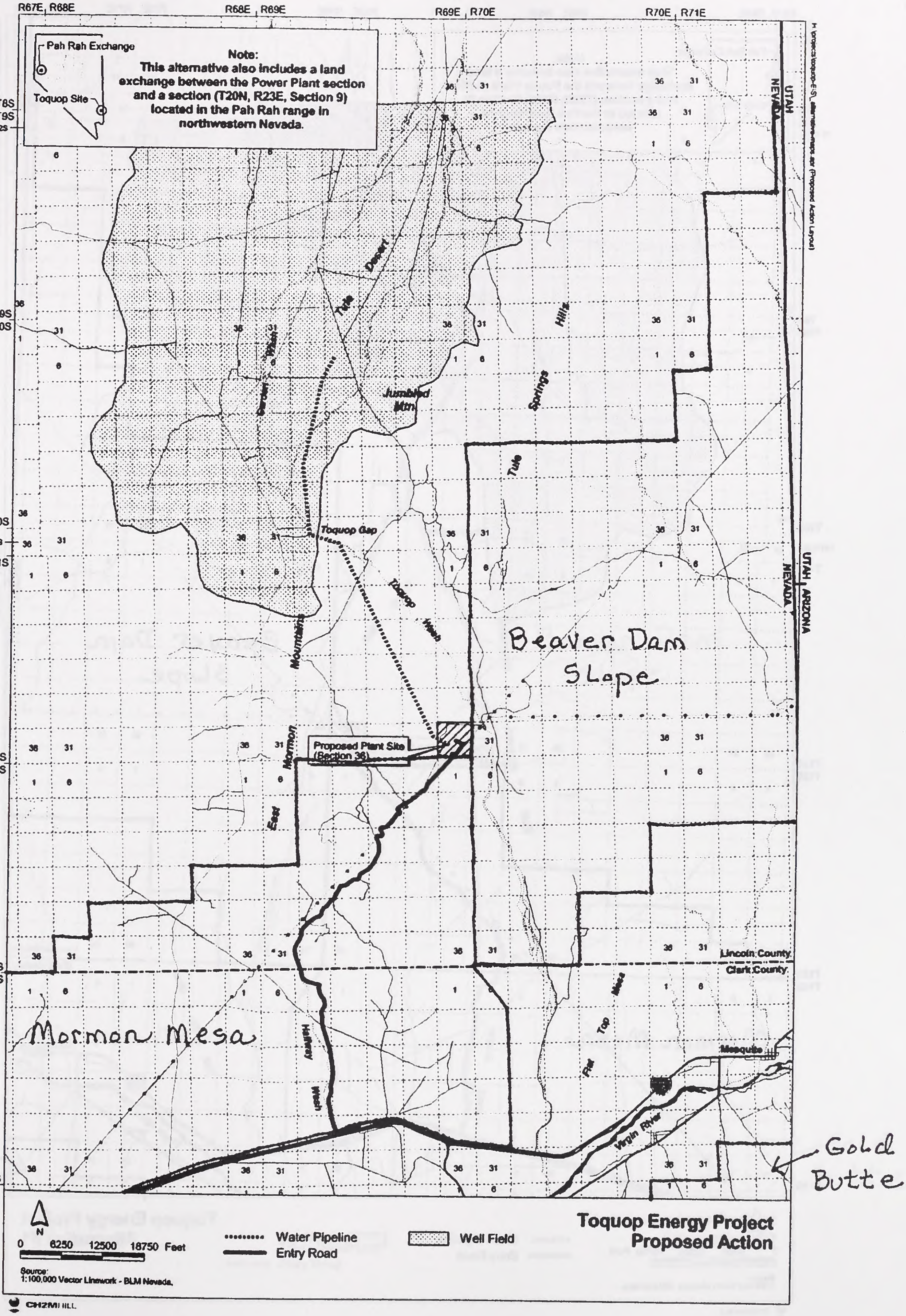
Western burrowing owl	*Athene cunicularia hypugea*
Black tern	*Chlidonias niger*
Blue grosbeak	*Guiraca caerulea*
American peregrine falcon	*Falco peregrinus anatum*
Least bittern	*Ixobrychus exilis hesperis*
Phainopepla	*Phainopepla nitens*
Summer tanager	*Piranga rubra*
White-faced ibis	*Plegadis chihi*
Vermilion flycatcher	*Pyrocephalus rubinus*
Lucy's warbler	*Vermivora luciae*
Arizona Bell's vireo	*Vireo bellii arizonae*

ATTACHMENT A (cont)
File No. 1-5-02-SP-431
November 29, 2001

Fish	
Virgin spinedace	*Lepidomeda mollispinis mollispinis*
Mammals	
Spotted bat	*Euderma maculatum*
Greater western mastiff bat	*Eumops perotis californicus*
Allen's big-eared bat	*Idionycteris phyllotis*
California leaf-nosed bat	*Macrotus californicus*
Small-footed myotis	*Myotis ciliolabrum*
Long-eared myotis	*Myotis evotis*
Fringed myotis	*Myotis thysanodes*
Long-legged myotis	*Myotis volans*
Yuma myotis	*Myotis yumanensis*
Big free-tailed bat	*Nyctinomops macrotis*
Pale Townsend's big-eared bat	*Corynorhinus townsendii pallescens*
Amphibians	
Arizona southwestern toad	*Bufo microscaphus microscaphus*
Relict leopard frog	*Rana onca*
Reptiles	
Banded Gila monster	*Heloderma suspectum cinctum*
Chuckwalla	*Sauromalus obesus*
Plants	
Threecorner milkvetch	*Astragalus geyeri* var. *triquetrus*
Sticky buckwheat	*Eriogonum viscidulum*
Beaver Dam scurfpea	*Pediomelum castoreum*

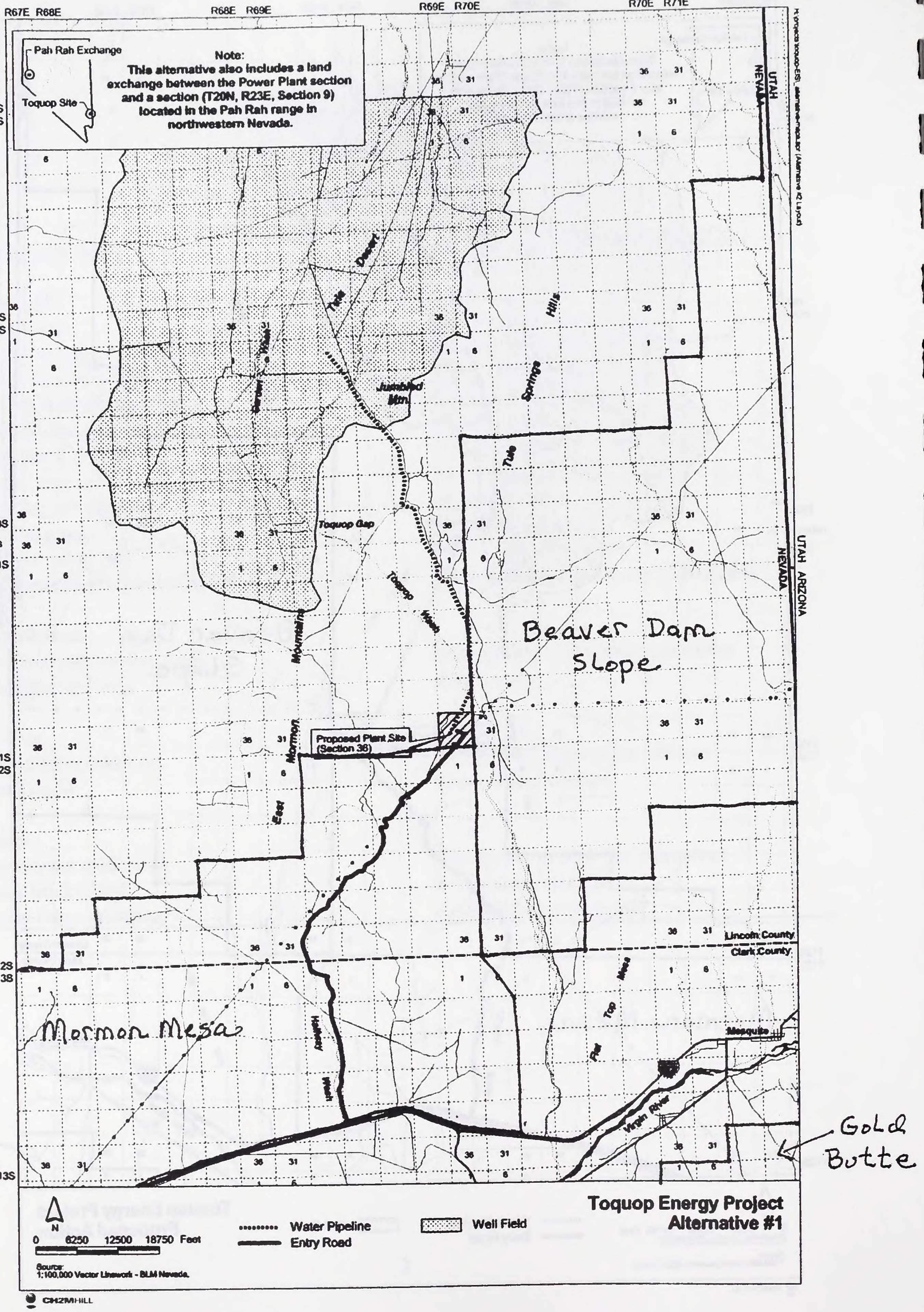
Attachment B-1

▭ = Desert Tortoise Critical Habitat Units



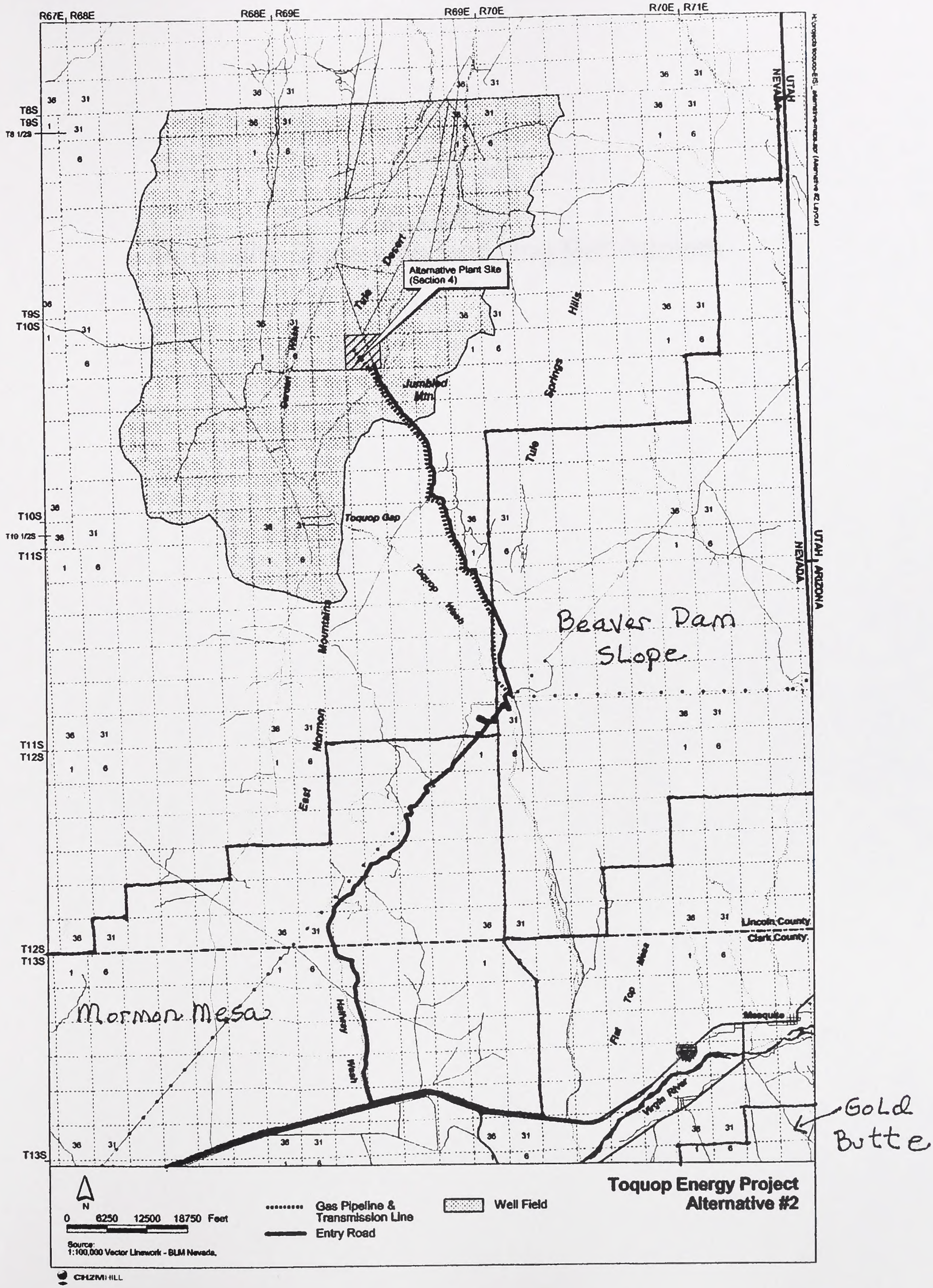
Attachment B-2

☐ = Desert Tortoise Critical Habitat Units



Attachment B-3

☐ = Desert Tortoise Critical Habitat Units



Appendix E

Air Quality Dispersion Modeling Methodology

APPENDIX E

Air Quality Dispersion Modeling Methodology

Air quality impacts in the "Class II" areas surrounding the site were determined with the Industrial Source Complex Short-Term (ISCST3) dispersion model.

In the "complex" terrain of the East Mormon Mountains to the west of the proposed facility, the CTSCREEN model was used to refine the impacts. CTSCREEN is the screening mode of the Complex Terrain Dispersion Model (CTDMPLUS). CTSCREEN uses an array of predetermined meteorological conditions to model user-supplied source-terrain configurations.

The basic model equation assumes that concentrations of emissions within the plume can be characterized by a Gaussian distribution of the plume. For a steady-state Gaussian plume, the hourly concentration at downwind distance x (meters) and crosswind distance y (meters) is given by:

$$C(x,y,z,H) = \left(\frac{Q}{2\pi\sigma_y\sigma_z u}\right) * \left(e^{-1/2(y/\sigma_y)^2}\right) * \left[\left\{e^{-1/2(z-H/\sigma_z)^2}\right\} + \left\{e^{-1/2(z+H/\sigma_z)^2}\right\}\right]$$

Where:

C = the concentration in the air of the substance or pollutant in question

Q = the pollutant emission rate

$\sigma_y\sigma_z$ = the horizontal and vertical dispersion coefficients, respectively, at downwind distance x

u = the wind speed at the height of the plume center

x,y,z = the variables that define the three-dimensional Cartesian coordinate system used; the downwind, crosswind, and vertical distances from the base of the stack

H = the height of the plume above the stack base (the sum of the height of the stack and the vertical distance that the plume rises because of the momentum and/or buoyancy of the plume)

Both CTSCREEN and ISCST3 are based on the steady-state Gaussian plume equation. In general, Gaussian dispersion models are conservative by nature and tend to over-predict actual impacts

The model user inputs meteorological data for the site, data on the air emission rates and stack parameters, and data on the elevation and location of "receptors." The models then use mathematical correlations to predict resulting pollutant concentrations at the receptors.

Air quality impacts and air quality related values (AQRVs) for the Grand Canyon National Park Class I Area were determined with the CALPUFF model. CALPUFF is a non-steady-state air quality modeling system developed for regulatory use. CALPUFF is a Gaussian puff dispersion model with chemical removal, wet and dry deposition, complex terrain algorithms, building downwash, plume fumigation, and other effects. Puff models are demonstrated to be more accurate than Gaussian plume models for prediction of impacts in areas greater than 50 km distant from the emission source.

Puff models represent a continuous plume as a number of discrete packets of pollutant material. Most puff models evaluate the contribution of a puff to the concentration at a receptor by a "snapshot" approach. Each puff is "frozen" at a particular time interval. The concentration resulting from the "frozen" puff at that time is computed. The puff is then allowed to move, evolving in size, strength, etc., until the next sampling step. The total concentration at a receptor is the sum of the contribution of all nearby puffs averaged for all sampling steps within the basic time step.

The basic equation for the contribution of a puff at a receptor is:

$$C = \frac{Q}{2\pi\sigma_x\sigma_y} g \exp\left[-d_a^2/\left(2\sigma_x^2\right)\right]\exp\left[-d_c^2/\left(2\sigma_y^2\right)\right] \qquad (2\text{-}1)$$

$$g = \frac{2}{(2\pi)^{1/2}\sigma_z} \sum_{n\quad\infty}^{\infty} \exp\left[-(H+2nh)^2/\left(2\sigma_z^2\right)\right] \qquad (2\text{-}2)$$

Where, C is the ground-level concentration (g/m^3),

Q is the pollutant mass (g) in the puff,

σ_x is the standard deviation (m) of the Gaussian distribution in the along-wind direction,

σ_y is the standard deviation (m) of the Gaussian distribution in the cross-wind direction,

σ_z is the standard deviation (m) of the Gaussian distribution in the vertical direction,

d_a is the distance (m) from the puff center to the receptor in the along-wind direction,

d_c is the distance (m) from the puff center to the receptor in the cross-wind direction, g is the vertical term (m) of the Gaussian equation,

H is the effective height (m) above the ground of the puff center, and

h is the mixed-layer height (m).

The summation in the vertical term, g, accounts for multiple reflections off the mixing lid and the ground. It reduces to the uniformly mixed limit of 1/h for $\sigma_z > 1.6h$. In general, puffs within the convective boundary layer meet this criterion within a few hours after release.

The buildings near the emission sources and potentially affecting downwash were analyzed using the Building Profile Input Program (BPIP) in order to estimate direction-specific building heights and projected building widths for use in building wake calculations. This information was input to the ISCST3 dispersion model.

Combustion turbines can operate over a variety of load conditions, resulting in a range of possible stack temperatures, exit velocities, and pollutant emission rates. As a result, the highest load condition for the turbine is not necessarily the most conservative case from an ambient impact prediction perspective. Therefore, a screening procedure was used to select the reasonable but conservative case parameters for modeling. In general, this means that lower stack temperatures and velocities, representing conditions for reduced turbine loading, were paired with higher emission rates, which would result from full turbine loading. Thus, the model input parameters could describe a situation which could never occur at the facility, but which would produce higher estimated ambient impacts than actual plant operating scenarios.

No meteorological stations exist in the Toquop area; therefore, no meteorological data sets meeting rigorous criteria for representativeness exist for the plant site. The Proposed Action potential impacts were modeled using a screening data set provided by NDEP BAQ. This file contains the SCREEN3 combinations of wind speed, stability class, and mixing height that are designed to capture a full range of possible dispersion conditions. Because the SCREEN3 meteorology does not incorporate wind direction, NDEP BAQ constructed the screening analysis input file by applying the full set of SCREEN3 combinations to each of 36 wind directions (each 10 degrees around the compass). Temperature is also not an explicit parameter built into the SCREEN3 meteorological combinations, so NDEP BAQ applied a range of temperatures (293, 298.7, 304.2, and 309.8 degrees Kelvin) to the full suite of combinations. Finally, mixing heights were assigned in accordance with the SCREEN3 Model Users Guide, as modified by NDEP BAQ. For neutral and unstable conditions, the SCREEN3 Model Users Guide recommends setting the mixing height at 10,000 meters to represent unlimited mixing. In the file constructed by NDEP BAQ, the mixing height was set to a more conservative value of 5,000 meters

For the complex terrain of the East Mormon Mountains, the USEPA's CTSCREEN model was used to predict impacts. As with the USEPA's SCREEN model, the CTSCREEN model uses a conservative meteorological data set to predict worst-case impacts. The CTSCREEN model has been demonstrated by the USEPA to estimate more accurate results, for complex terrain, than does the ISCST3 model. Complex terrain is defined as terrain with elevations above the final anticipated plume height, as calculated based on the stack height and plume rise.

As mentioned above, Gaussian distribution models such as ISCST3, SCREEN3, and CTSCREEN are generally invalid for distances greater than 50 kilometers. The closest point of the Grand Canyon National Park is approximately 78 kilometers from the Proposed Action location. Therefore, the CALPUFF model was used to determine the ambient impacts, and impacts on air quality related values (AQRVs) for the Grand Canyon National Park. A complete analysis using CALPUFF incorporates the results of the Calmet preprocessor, which develops a three-dimensional, time-based meteorological data set for the area surrounding the site. A screening run using CALPUFF incorporates a standard meteorological data set available from the National Weather Service (NWS), along with a number of conservative assumptions, to predict results documented to be equal to or more conservative (higher) than the complete CALPUFF analysis. NWS data from Las Vegas were used to run CALPUFF in screening mode to predict ambient pollutant concentrations, visibility impairment, and acid deposition on the Grand Canyon National Park for the PSD permit application. A complete CALPUFF was also run to estimate visibility impacts on the GNCP for this DEIS.

Although it is not a federally designated Class I area, the National Park Service requested that impacts on the Lake Mead National Recreation Area (LMNRA) be predicted for the Proposed Action as part of the PSD permitting process. Regional haze visibility impacts were calculated for LMNRA using the same CALPUFF model as used for the Grand Canyon National Park. In addition, the VISCREEN model was used to estimate reasonable but conservative discreet plume visual impacts for LMNRA.

Appendix F

Employment and Labor Income Multiplier Analysis Assumptions

APPENDIX F

Employment and Labor Income Multiplier Analysis Assumptions

A multiplier analysis utilizing IMPLAN PRO (Version 2) was used to generate the estimated employment and labor income impacts of the construction and operation of the Proposed Action and alternatives within the region of influence. The region of influence for the economic impact analysis is the combined regional economy of Lincoln and Clark counties in the State of Nevada. The 1998 IMPLAN data set for these two counties was used, without modifications to any study area data. A type Social Accounting Matrix (SAM) model was constructed, providing the multipliers used in the impact analysis.

Two industrial sectors were used in the analysis: one to estimate the impacts of construction activities; and a second to estimate the impacts of the operation of the facilities of the Proposed Action and alternatives. To estimate the total effects of construction employment IMPLAN *Sector 50: New Utility Structures* was used. The activities associated with the construction of the power plant, access road, wellfield, and water pipeline under all alternatives would fall within major SIC Industry Codes 15 and 16. Within the IMPLAN sector scheme, these SIC industries are matched with the IMPLAN Construction Sectors 48 to 56. Sector 50 was chosen from these potential IMPLAN sectors because this sector most closely describes the activities anticipated to occur during the construction phase of the Proposed Action or alternatives.

To estimate the effects on the regional economy of the operation of a power plant associated with the Proposed Action or alternatives, IMPLAN *Sector 443: Electric Services* was used. The operation of a natural gas-fired electrical power generation facility would fall within SIC code 4911 Electric Services. In the IMPLAN sector scheme report, the SIC industry 4910 matches with IMPLAN *Sector 443: Electric Services*. Part of the SIC industry 4910 also appears within the IMPLAN *Sectors 511: State and Local Electrical Utilities* and *514: Federal Electrical Utilities* that are both government sectors. In this analysis, IMPLAN Sector 443 was used because it matches directly with SIC industry 4910, and the facilities operated under the Proposed Action or alternatives would be privately owned. In addition, the multipliers for Sector 443 are somewhat lower than those of Sector 511, the next most logical sector choice. This selection provided a more conservative estimate of the potential beneficial effects of the Proposed Action or alternatives.

Tables F-1 and F-2 show the employment and labor income multiplier report information for the two industries used in the analysis.

TABLE F-1
Employment Multipliers for Selected IMPLAN Sectors

	Description	Type I Multiplier	Type SAM Multiplier
50	New Utility Structures	1.354757	1.748312
443	Electric Services	1.452192	2.036772

TABLE F-2
Labor Income Multipliers for Selected IMPLAN Sectors

	Description	Type I Multiplier	Type SAM Multiplier
50	New Utility Structures	1.238188	1.461733
443	Electric Services	1.264988	1.493389

In generating the indirect and induced employment and labor income effects for the analysis, the estimated direct employment and labor payroll information provided by Toquop Energy was used as the direct effects. The information is shown in Table F-3 below. Although the construction costs for Alternative 2 are somewhat different than those for the Proposed Action and Alternative 1, Toquop Energy has indicated that the labor force and payroll requirements would be the same. As such, the direct and, therefore, indirect and induced employment and labor income effects would be the same for the Proposed Action and both alternatives.

TABLE F-3
Assumed Direct Employment and Labor Income Effects

Project Phase	Average Annual Employment	Annual Labor Income
Construction	500	34 million
Operations	25	2.5 million

Source: Toquop Energy

BLM LIBRARY
BLDG 50, ST-150A
DENVER FEDERAL CENTER
P.O. BOX 25047
DENVER, COLORADO 80225

BLM LIBRARY
BLDG 50, ST-150A
DENVER FEDERAL CENTER
P.O. BOX 25047
DENVER, COLORADO 80225